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MACLENVAN AND REID ABSTRACTED THE EXPERIMENTAL LITERATURE PERTAINING TO INSTRUCTIONAL FILM RESEARCH SINCE 1950. HISTORICAL AND DESCRIPTIVE STUDIES, SURVEYS, SURVEYS OF RESEARCH, AND OTHER NONEXPERIMENTAL REPORTS ARE OMITTED. EACH ABSTRACT INCLUDES THE NUMBER AND DESCRIPTION OF SUBJECTS, CRITERION INSTRUMENTS, RELIABILITY AND VALIDITY DATA, AND STATISTICS USED (WHEN GIVEN). ALL FINISHED ABSTRACTS (EXCEPT DISSERTATIONS) WERE MAILED TO THEIR AUTHORS, WHEN THEY COULD BE LOCATED, FOR COMMENTS BEFORE THE FINAL TYPING. VOLUME ONE INCLUDES AN INTRODUCTORY SECTION BY LESLIE P. GREENHILL, WHO DISCUSSES THE TRENDS OF INSTRUCTIONAL FILM RESEARCH. (SEE ED 003 806 FOR VOLUME TWO) (JC)

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VoL. I

Abstracts of Research
on
INSTRUCTIONAL TELEVISION AND FILM

An Annotated Bibliography

by

Donald W. MacLennan

J. Christopher Reid

University of Missouri

With an introduction by Leslie P. Greenhill

Pennsylvania State University

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FOREWORD

In response to a suggestion made by Wilbur Schramm, the two authors undertook to abstract the experimental literature pertaining to instructional television, and the experimental literature pertaining to instructional film research since 1950. The cut-off date for the film literature was decided upon because of the fine Hoban-Van Ormer bibliography.

We decided not to include historical and descriptive studies, and omitted surveys, surveys of research, and other nonexperimental reports. Some studies were available to the authors in abstract form only. Whenever possible we sought the original work, but for those materials available only as abstracts, we included the abstracts when they appeared reasonably complete. Studies which used television or film for noninstructional purposes, such as personality experiments, were omitted from this collection.

We have tried to present each article in an objective manner, and have not commented on design, statistics, or whether the stated conclusions could in fact be drawn from the data. If a negative -- or positive -- bias exists it is unintentional. Our goal has been to present a sufficiently adequate abstract by including the number and description of subjects, criterion instruments, reliability and validity data, statistics used, etc., generally when given, so that the reader may frame his own decision. Some studies overlooked reliability or other data we should have liked to include in the abstract, and in a few instances the article was unclear.

All finished abstracts (except dissertations) were mailed to their authors, when they could be located, for comments before the final typing. We appreciate the comments that many authors made. If errors still remain, we apologize for them.

Mr. Reid abstracted articles in the Audio-Visual Communication Review, the USOE Title VII studies, dissertations, and all the various published booklets as well as mimeographed, duplicated, and offset material that was available. All dissertations, unless noted otherwise, were prepared from Dissertation Abstracts. Mr. MacLennan abstracted articles from the Armed Forces studies and from all other journals and periodicals. In some instances the original authors drew our attention to other works that we had not uncovered. In an area where research is so widely published, and so much material is circulated but unpublished, we cannot hope to have located it all. We do hope that authors will call our errors of omission and commission to our attention, so that this work might become more useful to all. This has truly been a cooperative project, and we are grateful for the help we have received.

We are grateful especially to Dr. Schramm for his procedural suggestions and his continual help and encouragement. To him belongs much of the credit, but none of the blame, for the study.

J. Christopher Reid
Donald W. MacLennan

April, 1964

A REVIEW OF SOME TRENDS IN RESEARCH ON INSTRUCTIONAL FILMS AND INSTRUCTIONAL TELEVISION

by

Leslie P. Greenhill
Director, University Division of Instructional Services
The Pennsylvania State University

INTRODUCTION

Educational historians of the future will probably note that the period from 1945 to 1965 represented two decades of intensive research on the development and use of films and television as instructional media, that is to say, as media for the stimulation of learning in more or less formal classroom situations. These historians may also note that this research was stimulated largely by a rapidly growing population that needed to be educated, by a predicted and actual shortage of competent teachers, and by the need for students to learn more than ever before because of the explosion of human knowledge during this period.

The great volume of research on these media has been made possible largely by considerable financial support, first from the Defense departments in the late 1940's and the 1950's; then by several of the philanthropic foundations in the mid-1950's; and more recently by the federal government through such agencies as the Office of Education. Alongside well-financed programs of research and well-supported projects there has been a steady stream of dissertation research conducted by individual researchers, sometimes under the auspices of well-financed programs, and often on the "shoestring" support that often characterizes doctoral studies.

Objectives of This Review

In 1951, under the auspices of the Instructional Film Research Program at The Pennsylvania State University, and with the financial support of the U. S. Naval Training Devices Center, Hoban and VanOrmer[1] produced a comprehensive report which summarized the results of over 200 experiments on instructional films conducted between 1918 and 1950. Practically all of the studies of television for instructional uses have been conducted since 1950. In fact, the decade from 1954-1964 might be characterized as the era of most intensive research on instructional television.

The 350 or so abstracts which constitute the main body of the present report represent a substantial sampling of the research on instructional films and instructional television in the period 1950 to 1964. The purpose of this introductory review is not to summarize individual studies; rather it is to point out (1) the directions in which the research has been going, (2) the present status of the research, and (3) some possible future directions for research on instructional films and instructional television.

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[1] C. F. Hoban and E. B. VanOrmer, Instructional Film Research 1918-1950. Technical Report No. SDC 269-7-19. U. S. Naval Training Devices Center, Port Washington, L. I., New York, December 1950.

In meeting these objectives an attempt will be made to indicate what is known with some confidence, that might be useful to school and college administrators and to film or television production personnel. In addition, some problems and possibilities in methodology will be discussed which may be helpful to graduate students and other researchers.

Categories of Research

In studying the accompanying abstracts, certain categories of studies became apparent to the writer, and it is proposed to discuss the trends of research within these categories. They are:

1. Comparisons of televised with direct or face-to-face instruction.
2. Comparisons of filmed or kinescoped courses with direct instruction.
3. Studies of other uses of television for instruction.
4. Studies of other applications of films for instruction.
5. Studies of attitudes related to instructional television.
6. Studies of attitudes related to instructional films.
7. Studies of effects of production variables in instructional television programs.
8. Studies of effects of production variables in films.

COMPARISONS OF TELEVISED INSTRUCTION WITH DIRECT INSTRUCTION

By far the largest category of research is that of "relative effectiveness" studies in which the performance of students instructed over television has been compared with the performance of others instructed directly or face-to-face by a teacher in the usual way. This therefore represents perhaps the most important trend of research in the last decade.

These relative effectiveness studies range from elementary school to college levels of instruction and to military training. They encompass a very wide scope of subject matter, for example: elementary school reading, foreign language speech and listening skills, physical sciences, social sciences, biological sciences, mathematics, and such military subjects as basic training and electronics.

The length of the studies varies from one or a few lessons to entire courses extending over a semester or a year. One military study involved a comparison of the performance of students who viewed television approximately eight hours a day for a period of a week, with that of trainees who received a similar amount of direct classroom instruction.

The vast majority of these studies has revealed "no significant differences" in measured performance between students who were instructed over television and those who were taught directly. A few studies have shown differences in favor of television, while a few others have found differences in the opposite direction. In some instances differences were found on immediate tests of learning which disappeared when students were retested after a delay of a few days or weeks.

Problems of Experimental Design

It must be said that a number of the studies are very uneven in quality, which makes interpretation of the results difficult or impossible. For example, in many studies the main variable (TV versus direct instruction) is mixed in with other variables such as different teachers teaching under each of the conditions. In this situation the comparison is really between Teacher A teaching on television assisted by Teachers B, C, D, etc., in follow-up work; with Teachers E, F, G, H, etc., in regular classroom situations. As a result of the varying experience and competence of the teachers in the various treatments, the results may favor one "method" or the other.

Another serious deficiency in some of the studies is the use of existing or intact classes (often in different schools) in the different comparison groups. This situation is often dictated by administrative convenience or by ignorance of the fact that such a situation makes comparisons between methods of instruction virtually uninterpretable. To be sure, in many of these studies efforts were made to measure initial differences between classes on some variable or variables expected to influence the results of the comparisons, such as intelligence, previous experience, number of members of each sex in the groups, and so forth, and then students were either "matched" across the methods being used or some statistical technique was employed in an endeavor to compensate for differences which existed between the groups whose performance was to be compared.

These efforts to compensate for inadequacies in experimental design are themselves inadequate in many instances, because other unrecognized variables may be operating to bias the results. Some examples of such uncontrolled variables might be: differences between schools in socio-economic status of students (i.e., some schools draw children from homes with richer environments than others). While the children may appear to be equal in previous knowledge, one group may have more potential for learning than the other or may get more help at home. A second kind of uncontrolled variable might be differences in motivation which result from differences in morale in various classes or schools.

The foregoing are cited merely as examples of factors that could bias the outcomes of comparisons. There may be many others. The only satisfactory way to deal with such variables is randomly to assign students to the comparison groups in such a way that uncontrollable biasing variables of the kind mentioned have an equal chance of affecting both groups. The results of experimental comparisons involving such randomized groups can then be interpreted using probability theory and appropriate tests of significance.

The reason for making such a strong issue of this matter here is in the hope that educational administrators will do everything possible to provide adequate conditions for experiments to be conducted that will have interpretable results and valid outcomes!

Stickell,[2] in a study conducted in 1963, carefully examined some 250 studies which had compared televised instruction with direct instruction. These were classified according to the extent to which they met his rather rigorous requirements for adequate experimental designs. Of the 250 comparisons, 217 were classified as "uninterpretable", 23 were classified as "partially interpretable", because of various defects in experimental design, and only 10 of the studies were classified as "interpretable". Of these 10, all showed no significant differences in learning at the .05 level between televised and direct instruction.

In summing up the results of the preceding discussion, it seems to the writer that the finding of "no significant differences" in comparisons of measured learning from direct and televised instruction is the only outcome from the "comparative effectiveness" studies in which there can be a good deal of confidence.

The Significance of Nonsignificant Differences

Many administrators and researchers have expressed disappointment at the frequency with which nonsignificant differences in learning have resulted from comparisons of direct and televised instruction and they seem to regard this finding as a negative result.

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[2] D. W. Stickell, A Critical Review of the Methodology and Results of Research Comparing Televised and Face-to-Face Instruction. Unpublished doctoral dissertation, The Pennsylvania State University, June 1963.

Later in the section on possible lines for future research there will be a discussion on some of the reasons why nonsignificant differences seem to typify the results of this kind of research. While a finding of no significant differences does not prove that no differences exist, there is a practical value in such results in that consistent findings of nonsignificant differences in learning from different instructional methods give educational administrators some confidence that several alternative methods of instruction are available for use, and the choice of which should be used in a specific situation may be based on considerations other than relative effects of the methods on learning.

For example, television has excellent distributive powers. It can extend instruction (good or bad) to many places simultaneously. It is, therefore, an excellent means of extending experienced teachers and above-average teaching resources to larger numbers of students than would be possible under conditions of direct instruction. In this way television can be used to offset a shortage of experienced teachers. To the extent that the television teacher is more experienced than the available classroom teachers and has better instructional resources than might be available to the average classroom teacher, it is possible that televised instruction can be superior to direct teaching. Some of the findings favoring televised instruction can possibly be accounted for by differences in the abilities of the teachers in the comparison situations rather than by the influence of television *per se*.

Another reason for using television may be to offer courses that would otherwise be unavailable. In some cases there may also be economic advantages from the use of televised instruction.

It is for these reasons that the use of instructional television has expanded so rapidly during the past ten years.

COMPARISONS OF FILMED OR KINESCOPED COURSES WITH DIRECT INSTRUCTION

A relatively small number of studies has been concerned with comparisons of learning from filmed courses, sometimes supplemented by a local teacher, with direct instruction. Some of the filmed courses have been originally produced as films; others were originally produced as television programs and made available for classroom use in the form of kinescope recordings.

A study by VanderMeer[3] in 1949 compared learning of groups of students in a ninth-grade biology course who were taught by (a) 44 sound films alone (each film was seen twice), (b) the same films plus specially prepared study guides, and (c) standard lecture-demonstration-discussion methods by a classroom teacher. There were no significant differences in performance of the students among the three methods on either immediate tests or delayed recall after three months. However, the "films only" group took about 20 per cent less time than the other two treatment groups to complete the course.

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[3] A. W. VanderMeer, Relative Effectiveness of Instruction by Films Exclusively, Films Plus Study Guides, and Standard Lecture Methods. Technical Report SDC 269-7-13, U. S. Naval Training Devices Center, Port Washington, L. I., New York, July 1950.

This general pattern of no significant differences has characterized more recent studies that have compared filmed courses with direct instruction in such subject areas as college-level psychology and communication skills, high school chemistry, physics, history, and industrial arts, and some technical subjects in military training. These studies indicate the potential usefulness of such film series as those being produced under the auspices of the Physical Sciences Study Committee and the Biological Sciences Curriculum Study Committee.

In individual situations it might be desirable to conduct quality control experiments to determine whether the use of such film series has advantages over the existing classroom situation. However, in many high schools and colleges where great difficulty is being experienced in securing qualified faculty in certain specialized subjects, there is little doubt that effective learning can be stimulated by using such film series, or series of videotapes produced by other institutions, supplemented by whatever local resources are available.

A large area for future development and experimentation is the filmed course for home study using the recently introduced cartridge-loading 8mm film projectors. Such courses may prove to be very satisfactory for the retraining of adults, especially in technical and professional fields.

STUDIES OF OTHER USES OF TELEVISION FOR INSTRUCTION

While the dominant trend in instructional television studies over the past ten years has centered around comparisons of televised with direct instruction, there has also been a fairly steady stream of research which is concerned with developing uses for television other than the presentation of substantial parts of courses, and in exploring for ways of more effectively using television for classroom instruction.

Observation of Demonstration Teaching

Because of the difficulties of taking increasingly large numbers of teacher trainees into classrooms to observe demonstration lessons, a number of studies have been directed toward comparisons of televised observation of teaching situations with actual classroom visitations. One of the main difficulties faced by such studies is the selection or development of appropriate criteria for evaluating the effectiveness of the methods being compared. In some instances, where the observations have been part of a required course on methods of teaching, the course examinations have been used as the criteria. In such cases there may be very few questions on which observation of teaching demonstrations has a direct bearing. In several other studies, strong efforts have been made to determine the unique contributions to the learning of student teachers which should be derived from such observations, and special situational tests covering classroom behavior of teachers have been developed to assess the effects of such observations.

Some studies have been concerned also with students' preferences for one method of observation or another.

The generalizations that can be offered at the moment indicate that teacher trainees appear to gain as much from televised observations as from actual visitations; that they tend to prefer direct observation and, where televised observations are used, two or more views of the classroom being observed are preferred over one view. In many situations it has been found possible to install two or three television cameras, one of which provides a general scene of the classroom being observed, while the others provide close-ups, and all two or three scenes can be viewed simultaneously on adjacent television receivers by the student teachers. This method of observing teaching demonstrations has several practical advantages: (1) It permits observations by larger numbers of students than could be handled in classroom visitations. (2) Concurrent analysis and discussion can be conducted. (3) The viewing can be at a convenient location remote from the demonstration classroom.

The major technical problem appears to be in the pick-up of classroom conversations by microphones. This problem is being solved in various ways, through the use of acoustical treatment of the classroom including a rug on the floor, by multiple microphones, and, if necessary, by use of a roving microphone handled by the demonstrating teacher, whose own voice can be conveniently heard by means of a lavalier microphone on a long cord or by a wireless microphone.

Another use of television for teacher training that is just beginning to be studied and that deserves more study and evaluation is the recording (on film or videotape) of teaching demonstrations by teacher trainees (or even experienced teachers) and the subsequent analysis and discussion of these performances by the teacher concerned and by others who may be able to assist in the improvement of such classroom performances. Before-and-after videotape recordings could be compared in effectiveness under controlled conditions in order to determine whether changed classroom behavior on the part of a teacher actually produced more learning by the students.

In-service Training and Professional Training

Another observable trend in the research of the past few years is the use of television for in-service training of teachers and other professional personnel. Some of the studies in the accompanying abstracts indicate that such objectives can be effectively attained.

With the rapidly growing need for retraining in many professions as a result of new developments and the need to train people for new jobs as the result of technological changes in the nation's economy, it would appear that much more research along these lines is going to be needed if effective procedures are to be developed to help individuals avoid professional obsolescence. The use of television or films may be the only practical way of carrying such training to the numbers of people who need it.

Television for Teaching Performance Skills

Another line of research is developing out of a few studies of the use of television for teaching performance skills (technically known as perceptual motor skills). Much more research on teaching such skills was done with films in the early 1950's, probably because of the interest of the military sponsors of film research in improving the performance skills of military trainees. However, the flexibility and reach of television make it a potentially excellent medium for the teaching of a wide variety of perceptual motor skills. In the accompanying abstracts there are a few studies that have dealt with the teaching of typewriting, elementary-level reading, and the development of laboratory skills in the sciences.

Many possibilities for future exploration and study suggest themselves in the development of reading proficiency in high school children and adults, the teaching of trouble shooting for repair men, the teaching of assembly skills, even the teaching of improved driving habits for car owners!

In teaching some skills it is undoubtedly necessary to provide for concurrent practice by the learner. To achieve this, a demonstration is presented in a series of steps and time is allowed for the learners to perform each step on their equipment before the next step is shown over television. Some of the early film research studies testified to the efficiency of this method if the rate of development of the presentations was slow enough to permit the learners to alternate attention between the demonstration on film and their own performance.

In teaching certain kinds of skills at the elementary school level (e.g., foreign language) it has been found advantageous to elicit the help of parents by having them view the broadcasts and then provide an extension of the learning situation at home. Such a procedure might well be used for assisting preschool children to acquire reading skills, by teaching their parents the basic requirements for developmental reading.

Supplementary Activities

There has been an increasing number of research studies which have investigated various means of supplementing televised instruction. These have included the use of workbooks or study guides, correspondence materials, programed materials, and discussions led either by qualified teachers or by advanced students.

Whether or not these supplements lead to increased learning seems to depend on whether they are in addition to the full television lesson or lessons, thus requiring increased time, or whether they are substituted for part of the lesson. In the former case, the studies tend to show increases in learning, to the extent that the supplementary activities are relevant to what is being tested and if they reinforce or clarify what was presented in the television lessons. If the supplementary activities are substituted for part of the television lesson, it does not seem to matter very much which combination is used. There is little doubt, though, that repetition in some form or another is one of the most effective ways of increasing learning. In the practical classroom situation such repetition may result from supplementing televised instruction with discussion, projects, homework assignments, reading, laboratory work, and the like.

Another continuing line of research has been concerned with viewing conditions in television classrooms. Some studies have been concerned with such variables as size of the viewing groups, screen viewing angle and distance, and small-screen versus large-screen television. In most of these studies, within broad limits, it has been found that these variables do not relate significantly to learning. Obviously the learners have to be able to see the stimulus materials, read printed symbols presented over television, and hear what is carried by the audio. In most television classroom situations this is possible, although poor acoustics, or excessive light from outside or within the room may operate to reduce the clarity of picture and sound cues.

For practical production reasons it is generally desirable to set some standards for maximum viewing distance, and then in selecting size of print and amount of material to be covered by the television camera the producer should ensure that such material will be legible when viewed by learners with normal eyesight from the maximum viewing distance. A commonly used standard for maximum viewing distance is twelve times the width of a television screen and for viewing angle not more than 45° on either side of a line perpendicular to the face of the screen.

One aspect of the learning environment which has not been systematically studied is the physical climate--temperature, humidity, and air circulation. Many television classrooms and rooms used for film projection have very poor ventilation, and this condition may interfere with learning.

STUDIES OF OTHER APPLICATIONS OF FILMS FOR INSTRUCTION

In recent years the research on the use of films for serving a variety of educational purposes has closely paralleled the research on television. This is not exactly surprising, because some film studies have actually used kinescope recordings produced from television programs. In fact, it is often difficult to decide whether a specific study is television research or film research.

Films, however, do have some special characteristics. It is usually easier to record a wide range of stimulus materials on films from many different locations and in this way to bring the outside world into the classroom. Furthermore, while television may afford an excellent way of distributing films to classrooms, there are many classrooms that do not have access to television. In addition, some new ways have recently been developed for packaging and using instructional films that encourage new applications. Because of these possibilities there have been some differences in research on the use of films and television for some instructional purposes that should be noted:

Observation of Demonstration Teaching

Several studies have used documentary films of actual classroom teaching for teacher-training purposes. This has permitted a wider sampling of teaching demonstrations than would ordinarily be possible with live televised observations or classroom visitations. The films can be reviewed several times if desired.

Similarly, films of student-teaching performances have been made and used to assist the training of student teachers. Some of these studies have shown significant differences in favor of the film groups in comparison with those submitted to traditional procedures.

Films for Teaching Skills

There have been some studies in the past 10 to 15 years in which films have been used for teaching performance skills such as reading, typing, sewing, athletic skills, and foreign language vocabulary.

As was indicated in a previous section, much more of this research is needed, as many new applications for films have been opened up by the development of special projectors and easy-to-load cartridges containing 8mm film loops. This equipment provides excellent opportunities for establishing self-instructional situations, especially for teaching laboratory, language, and reading skills.

The use of this equipment is at present in what might be described as a developmental phase. Soon it should be ready for some serious research.

Studies conducted in recent years in the methods of using films provide further evidence of the effectiveness of repetition as a means of increasing learning. However, several studies have shown that even this variable can be used to excess, and that it is possible to produce a reduction in learning as well as negative attitudes by too many showings of a film (usually in excess of two or three showings).

There is some evidence that practice in learning from a given medium results in the development of an ability to learn from that medium with increasing effectiveness.

Feedback

There have been efforts to provide various methods of feedback to the instructor and/or learner in learning situations where extensive use is being made of television or films.

Some studies have involved the use of two-way communication systems in conjunction with closed-circuit television. Others have included the presentation of questions at the end of a television program or film showing--with provision of correct answers to the learners, and knowledge of level of performance to the teacher who can then supplement the material provided by the film or television lesson.

Immediate knowledge of results on tests appears to increase learning, but there are not enough studies of the use of electronic feedback and classroom communicator systems to be able to note any consistent trends in results.

It is suggested, however, that for such feedback systems to be effective, every student must respond to questions, respond to them frequently, and receive immediate knowledge of results. An alternative way of providing for such interaction between learners and stimulus materials is to program questions and knowledge of results into the filmed or televised lessons themselves. Some studies of these possibilities will be discussed in a later section.

Realistic Performance Tests

An application of films and television which has been the subject of very little research is the use of these media for the presentation of lifelike performance tests. Such test situations can contain most of the visual and sound stimuli found in real life and can test performance beyond that which paper-pencil tests can cover.

Because they present concrete situations, such tests can avoid the ambiguities of meaning sometimes present in verbal tests, and this can result in high reliability.

STUDIES OF ATTITUDES RELATED TO INSTRUCTIONAL TELEVISION

Attitudes of Students and Faculty

Research on instructional television has placed heavy emphasis on assessing the attitudes of students and teachers to the use of television for the presentation of classroom instruction. In fact, a considerable number of the "relative effectiveness" studies also included attitude measures as well as tests of learning.

It is interesting to speculate on the reason for this trend. Perhaps it is because television appears to threaten the position of the classroom teacher, or is perceived as a technological device which will take the human element out of teaching and perhaps result in less effective learning.

For whatever reasons, there have been many studies, the results of which have varied tremendously. In some situations students have been quite negative to televised instruction; in others they have been highly favorable; in many studies they have been neutral. It is difficult to sum up the trend so far as student opinions are concerned. Students' opinions are most probably a function of the attitudes of their teachers, or of the quality of the instruction presented to them by means of television. In most cases it would appear that students' attitudes have not been a serious barrier to the use of instructional television.

On the other hand, faculty attitudes have often been somewhat more negative than those of students, and in many institutions of higher learning negative attitudes of the faculty have been the greatest impediment to the use of television. However, when the need to use television is clearly explained and justified (for example, by increased student enrollments, an actual shortage of faculty, etc.), there are usually sufficient numbers of good teachers who are willing to teach on television to make its use viable.

It has been said that "people are often down on things they are not up on." Several studies have indicated that one way of gaining increased faculty acceptance of instructional television is to involve faculty members actively in the planning and conducting of an experiment in the use of television for teaching a course in their own discipline.

Methodology in Attitude Measurement

One of the most interesting trends is in the development of varied methods for assessing students' attitudes to televised instruction. In some studies simple questionnaires have been used which sought to ascertain what students thought about specified aspects of classroom uses of television. Other studies have made use of Thurstone or Guttman attitude scaling methods.

Some experimenters have attempted to obtain indications of attitudes by means of indirect methods such as asking students to "size up" the subjects they were taking, on the basis of several criteria. The experimenters could then see how televised courses were "sized up" in relation to other courses.

In recent years there has been rather extensive use of Osgood's Semantic Differential to assess students' attitudes to instructional television.

Most of the approaches that have been used have employed verbal measures of one kind or another. However, there is a variation of this approach which appears to have many possibilities for assessing students' attitudes as they are expressed in preferences for different methods of instruction. This is the "free-choice" method. A group of students is randomly divided into several sub-groups, each of which receives a different method of instruction. After a certain period of time the groups switch methods for a similar period of time. They are then given a free choice among the methods for several successive class periods, after which the method they choose is the one they must accept for the remainder of the year or semester.

An alternative procedure is to have the students vote on which method they would prefer, following exposure to the alternative methods. Whatever the majority wishes is the treatment that the entire group receives for the ensuing period. This procedure avoids some of the difficulties of verbal measures of attitudes and provides an opportunity for obtaining a measure of actual behavior.

It should be mentioned in summing up this discussion that most of the studies of students' attitudes toward instructional methods have found little or no relationship between attitude toward or preference for different methods of instruction, and actual measured learning from those methods.

The Use of Television to Influence Course-Related Attitudes

One of the objectives of much teaching is to influence students' attitudes toward ideas or issues in certain desired ways. There have been a few studies of the ability of instructional television presentations to change students' course-related attitudes. Generally they have shown that such attitudes, which can usually be modified by the use of appropriate information, are changed in a favorable direction by means of televised instruction and to about the same degree as they are changed by direct instruction.

Additional studies of the factors that produce cognitive attitude changes in students, whether by televised or other methods of instruction, are certainly needed.

STUDIES OF ATTITUDES RELATED TO INSTRUCTIONAL FILMS

It would seem that the trend in film research so far as attitude studies are concerned is the reverse of that in research on instructional television. Very few studies have been concerned with assessing attitudes toward films as a medium for instruction, whereas a considerable number have been concerned with the use of films to modify students' attitudes, and with the factors that produce attitude changes from film stimulation.

Generally, it has been shown that relevant information presented in films will produce changes in course-related attitudes. The way in which the students perceive the role of the communicator and his prestige as they see it, appear to be important factors in the effectiveness of this type of communication. Another factor is the perceived usefulness of the information. Students who believe that the material to which they are being exposed is going to have early use or will be subject to testing at an early date tend to learn more than students who do not have these attitudes. Thus, pointing out the personal relevance of instructional material to students may have an important effect on the degree to which the material is learned.

STUDIES OF EFFECTS OF PRODUCTION VARIABLES IN INSTRUCTIONAL TELEVISION PROGRAMS

One disappointing aspect of the research on instructional television over the past decade is the relatively small number of studies that have dealt with production variables or variations in methods of organizing and presenting the program content. This is rather surprising in view of the fact that television production facilities are widely available and it is not a difficult task to develop differing versions of televised lessons or courses for comparison under controlled conditions. Furthermore, it is not unreasonable to expect that manipulation of the stimulus materials which are presented to students might be one of the most likely ways of producing differences in learning.

Some studies reported in the abstracts have dealt with rather gross variables, such as the use of visualization (e.g., pictures, demonstrations, films, diagrams, and discussion panels) versus a lecture-blackboard presentation over television. Others were concerned with the method of presenting information in a television program--for instance, by means of a lecturer, a discussion panel, or interview. Most of these studies have failed to find significant differences in learning. However, a study by Skinner[4] found that an actor trained to perform as a "good" speaker was able to produce significantly higher scores on immediate tests and delayed retention tests than he did when he acted as a "poor" speaker. Another study, by Swarzwalder,[5] found that fifth-grade pupils generally did significantly better on a science content test when they had viewed television programs that had planned continuity, visual reinforcement, and had been the result of a team approach to make effective use of the medium. Conversely, in another study of production variables, Ellery[6] found no significant differences in learning of students when exposed to televised programs using such production variables as dollying versus cutting, production errors versus no production errors, a limbo set (no visible background) versus a non-limbo set, and flat lighting versus key lighting.

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[4] T. D. Skinner, An Experimental Study of the Effects of Prestige and Delivery Skill in Educational Television, Unpublished Doctoral Dissertation, University of Michigan, 1963.

One very encouraging recent trend is the incorporation of some of the techniques of programed learning into television programs. This involves the inclusion of questions or short problems for students to solve, followed immediately by knowledge of results. Such an arrangement provides for active audience participation, with immediate reinforcement.[7,8] It is also an excellent way of working repetition into a television program. An increasing amount of sophisticated research along these lines is predicted for the future.

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[5] J. C. Swarzwalder, An Investigation of the Relative Effectiveness of Certain Specific TV Techniques on Learning, USOE Project No. 985, KCTA-TV, St. Paul, Minnesota, 1960.

[6] J. B. Ellery, A Pilot Study of the Nature of Aesthetic Experiences Associated with Television and Its Place in Education, Wayne State University, Detroit, Michigan, 1959.

[7] G. L. Gropper and A. A. Lumsdaine, The Use of Student Response to Improve Televised Instruction--An Overview, American Institute for Research, Pittsburgh, Pennsylvania, 1961.

[8] C. R. Carpenter and L. P. Greenhill, Comparative Research on Methods and Media for Presenting Programmed Courses in Mathematics and English, The Pennsylvania State University, University Park, 1963.

Another approach that has much potential for improving televised instruction is what the author terms "empirical course development". Briefly, this process involves:

1. Defining course and lesson objectives in terms of detailed descriptions of desired terminal behavior of students.
2. Building, testing, and refining adequate measures of student performance.
3. Selecting content and presentation methods which appear to be appropriate to the stated objectives, and recording these on videotape.
4. Exposing students to the televised course and administering the criterion test or tests.
5. On the basis of an analysis of test performances and on the basis of interviews with students, making modifications in the original lessons and recording revised versions.
6. And finally, comparing the effects of the original version and the revised version on the performances of students randomly assigned to the two treatment groups.

It is anticipated that through the use of this process many production variables could be modified, studied, and evaluated, as well as varied means for producing audience participation.

STUDIES OF EFFECTS OF PRODUCTION VARIABLES IN FILMS

There has been a long tradition in film research going back to the Instructional Film Research Program at The Pennsylvania State University and the studies conducted by the U. S. Air Force, which has manipulated film variables by producing special versions of films incorporating defined variables and then comparing the effects of these versions on appropriate groups of learners under controlled conditions. This type of research has tapered off in recent years, possibly as the result of a shift of emphasis to research on television and partly because such research studies require good film production facilities and the kind of adequate financing that can only come from a sustained program of research.

Many of the studies of production variables in films included in the accompanying abstracts date from the early and middle 1950's. There are comparatively few recent ones.

Since the variables studied have been so numerous, it is not possible to summarize the results here. It should be noted, however, that several studies have investigated various methods of obtaining audience responses by inserting questions in films or by having the audience call out words.

Other studies have compared inserted titles with no titles, sound films versus silent films with teacher's commentary, motion pictures versus a series of still pictures, animation versus live photography, effects of variations in vocabulary difficulty, and various kinds of attention-directing devices.

A number of these studies have found small but significant differences in learning. However, it should be noted that the majority of studies which have compared black and white with color films have not found that this variable produced marked differences in learning.

There is not the slightest doubt that suitable films stimulate learning and that the way in which films are produced can influence the degree of learning. On the other hand, it would appear that no techniques have yet been discovered for consistently producing large and significant differences in learning.

RESEARCH METHODOLOGY

In reviewing the film and television research of the past fifteen years, the writer was impressed by two characteristics which were perhaps most evident in the television research. The first is the fact that a number of the studies had deficiencies in their experimental designs. The most common of these were the use of non-random groups and the confounding (uncontrolled mixing) of variables. In addition, some studies used very short tests, and some studies provided no evidence of test reliability. This situation makes interpretation of results very difficult indeed.

The second characteristic of the research is the large number of nonsignificant differences that have been obtained, and even where statistically significant differences were found, there is an absence of differences of large magnitude, say of the order of two to one or greater between different methods of instruction.

It is interesting to speculate on the reasons for the failure to find large and significant differences. Some people have suggested that the measuring instruments are not sharp enough to detect differences which may exist; others suggest that the use of predominantly verbal tests with visual media is the reason. Another hypothesis is that many studies have dealt with comparisons of complexes of variables which tend to cancel each other, while still other experiments were concerned only with single variables which in many cases are not sufficiently potent to produce significant differences in learning.

Another hypothesis is that the "Law of Compensatory Effort" is operating in many learning situations. This law asserts that students have certain levels of aspiration and that they strive for a particular grade. If the instruction is improved in a course which is the subject of an experiment, many students will put less effort into that course and will work harder in other courses which are not being taught as well and where more effort is needed to achieve the desired grade!

In a more serious vein, it is suggested that possibly the most fruitful areas for research lie in the structuring and organizing of the stimulus materials themselves, and in the manipulation and control of student responses. Comparisons among presentations which simply involve different media are not likely to be very fruitful.

Another approach to finding significant differences might be through the use of "additive" designs[9] in which the experimenter begins with a basic treatment and then progressively adds variables, and compares the new combination of variables each time with the basic treatment.

An alternative to this type of approach is the use of the complex multi-variate design involving a considerable number of variables in different combinations. In this situation it may be found that interactions among variables are very important and that certain combinations of variables have reinforcing effects on each other, thereby producing significant effects on learning. Results of preliminary studies conducted by Siegel[10] of Miami University at Oxford, Ohio, indicate that such experiments which manipulate the "instructional gestalt" by means of multi-variate designs may be very productive.

The writer would like to make one final plea. Whenever substantial differences in learning in a classroom experiment are found, the study should be repeated several times, using similar but different populations to be sure the results are not due to chance or are an artifact of some specific experimental situation. The building of a tradition for replication of studies in research on instruction is needed.

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[9] L. P. Greenhill, "New Directions for Communication Research," Audio-Visual Communication Review, 7(4):245-253, Fall 1959.

[10] L. Siegel and L. C. Siegel, "The Instructional Gestalt: A Conceptual Framework and Design for Educational Research," Audio-Visual Communication Review, 12 (1):16-45, Spring 1964.

Meanwhile, the research of the past fifteen years gives some confidence that a variety of media and methods of instruction can be used effectively to meet different needs, and that the determining factors in selecting such methods and media are not so much the effects on learning, as they are other considerations, such as the lack of availability of good teachers, the need to reach individuals in various locations, and perhaps economic considerations.

In the final analysis, it may be that the "best" method of instruction is one that provides students with a wide variety of learning situations, situations which will develop the varied learning skills that they will need for continuing their education throughout their lifetimes.

Abbey, June C., et al. Home and hospital viewing of continuing education broadcasts under three presentation-response conditions. Theo S. Grant and Irving R. Merrill, Television in Health Sciences Education. USOE Project Number 164. San Francisco: University of California, San Francisco Medical Center, September 30, 1963. Pp. 8-21. (Offset)

Problem: determine effects of group viewing and response conditions on learning.

Sample: 150 professional nurses from three cities.

Subject taught: Recent Advances in Nursing Care of the Aged (two programs each on Emotional Illness, Emphysema, and Cerebral-Vascular Accidents).

Key variables: individual or group viewing, covert and overt responses, learning, time of testing.

For a pilot study, 35 nurses were assigned to four viewing conditions: groups one and three had overt responses to participation questions with feedback, group two had covert response to participation questions without feedback, and group four had covert response to a conventional broadcast (having no participation questions) without feedback. Groups one and two were tested a week before the other groups. All subjects watched the two programs on emphysema, with the overt response group responding to answer sheets during each program. After the two programs, all took a half-hour non-related exam, then all took a 20-item test having half of the items related to emphysema and half non-related.

Chi square indicated a significant ($.01 < p < .02$) interaction between overt and conventional responses and related and correlated test items, with the overt response group tending to do better on the related items and the conventional group tending to do better on the unrelated items.

The main study was designed in a Graeco-Latin square, with 40 nurses in each of three different cities viewing half-hour TV programs on three different topics in three different orders under the three response conditions. Within each city 20 viewed at home and 20 together. The overt response treatment programs were five minutes longer since they included ten participation questions which appeared on the screen. The home and hospital viewing groups were equated for age, number of children, and shift worked. Two stations used videotape and one kinescope. All viewers took three 20-item multiple-choice achievement tests.

Ss in the overt response condition tended to have higher achievement scores than those in the covert response condition to participation questions, who in turn tended to have higher achievement scores than those in the covert response to conventional broadcasts (without participation questions). Ss who viewed at home had significantly higher (.01 level) achievement scores than those who viewed as a group in a hospital. Ss had significantly higher achievement scores (.01 level) on the first program viewed than on the two later programs in the series. Ss having a complete response had significantly higher achievement scores (.001 level) than other Ss. Significant interactions (.01 - .05 level) were also found for city and viewing condition, response completion and viewing condition, and response completion and city.

Abel, Frederick Paul. Use of closed-circuit television in teacher education: Relationship to achievement and subject matter understanding. Unpublished Doctor's dissertation, University of Minnesota, Minneapolis, 1960.

Problem: compare the effectiveness of using closed-circuit television for classroom observation with film and direct observation methods.

Sample: students in a teaching methods class at Minnesota.

Subject taught: classroom observation in Introduction to Secondary School Teaching.

Key variables: learning from direct classroom observation, from television and from film observation, and scores on Horrocks and Troyer Tests.

Students were matched on the basis of Miller Analogies Test scores and scores on a pretest designed to measure course subject matter. They were then randomly assigned to one of three groups: television, film, and direct observation. The television observations were of a university high school speech and physics class. The film observations were of films produced by McGraw-Hill and Indiana University. The direct observations were in smaller groups of classes in the university high school and other public high schools. Each group watched five periods using its primary observation method and one period each by the other two observation methods.

Instruments used to measure learning of the subject matter and ability to apply that knowledge were the midquarter and final examinations in the course, and Horrocks and Troyer Tests of Human Growth and Development.

No significant differences were found among the three groups as determined by the scores on these two instruments.

University of Alabama. Learning Aural-Oral Spanish Skills by Television. University of Alabama and the Alabama Special Educational TV Project, December, 1960. NAEB Research Fact Sheet, Series I, 91, NAEB Journal, 20 (May 1961), 1-2. (Abstract)

Problem: comparative effectiveness of TV and face-to-face teaching.

Sample: 181 students.

Subject taught: Spanish aural-oral skills.

Key variables: TV teaching, face-to-face teaching with experienced instructors, face-to-face teaching with inexperienced instructors.

Educational TV Spanish program produced by University of Alabama Broadcasting Services and taught by a University professor. High schools used ETV program in Spanish classes with a face-to-face session supplementing the TV lesson taught by a qualified teacher or by a non-qualified teacher. Control sections were taught entirely by face-to-face methods. Twelve classes were used altogether.

Achievement was evaluated by a two-part test: (1) a list of 21 questions to be asked and answered in Spanish; (2) a Spanish reading selection. Seventy-one students were selected at random to be interviewed in schools. Interviews were given in last month of the school year. Recordings were made of each interview and evaluated by a committee of expert judges for pronunciation, comprehension, vocabulary, and grammar.

Conclusions. The interrelationships indicate considerable agreement between independent judges in rating the two variables of pronunciation and comprehension, vocabulary and grammar. The intervariable correlations indicate that considerable variance was not common to the two variables existing. Students taught the aural-oral Spanish skills by ETV and non-qualified teachers are as proficient in those skills as students taught by qualified teachers in a face-to-face situation. Students taught by ETV and qualified teachers do learn the measured aural-oral skills significantly better than either non-ETV students taught by qualified teachers or ETV students taught by non-qualified teachers.

Alexander, Forrest Doyle. An experiment in teaching mathematics at the college level by closed-circuit television. Unpublished Doctor's dissertation, George Peabody College for Teachers, Nashville, 1961.

Problem: compare achievement in mathematics when presented by television or by face-to-face methods, and determine the effectiveness of using two instructors rather than one.

Sample: male students.

Subject taught: fundamental mathematics.

Key variables: number of instructors, television presentation, and learning.

All students were randomly assigned to one of four sections. Two sections received thirty minutes of televised lecture. One section then finished the hour with a discussion led by the television professor, while in a second section the discussion was led by a different teacher. Sections three and four both had a face-to-face presentation by an instructor who followed the same outline as the television teacher. Then a partition was placed between the two groups. The third section continued to be taught by the same teacher, while the fourth section was taught by another teacher. Four teachers were used altogether.

Achievement was measured by a specially constructed instrument (Pearson r = .90 and K-R #8 r = .88).

Analysis of variance technique failed to reject the following hypotheses: There is no difference in achievement scores between the television and non-television lectures; there is no difference in achievement scores between sections having one or two instructors, and there is no interaction between instructors and modes of presentation.

Alexander, Virgil William. The contribution of selected instructional motion pictures to achievement in varying school situations, Abstracts of Doctoral Dissertations, the University of Nebraska, Vol. 11. Lincoln: University of Nebraska, 1950. Pp. 146-152.

Problem: determine the achievement of pupils seeing motion pictures as a function of school size, class size, teacher preparation, teacher experience and teacher training in audio-visual materials.

Sample: 29 Nebraska high schools in 1948-49 and 28 Nebraska high schools in 1949-50.

Subjects taught: general science, biology, physics, American history, world history and modern problems.

Key variables: school size, class size, teacher preparation, teacher experience, teacher training in audio-visual materials, and learning.

All students took Cooperative Test Service standardized tests before and after the school term for all courses except modern problems. Students taking modern problems took a USAFI instrument as pre- and posttest. CTMM scores were also available for all students. School sizes were grouped as having less than 101 students, 101-200 students, and 201 or more students. Teacher preparation was operationally defined as teacher education, and three classifications were made in that category. Teacher experience also had three classifications. Class sizes were grouped into less than 16, 16-30, and 30 or more students. Teachers were divided into two groups, in terms of having or not having had specific training in audio-visual materials.

Analysis of covariance technique was used to determine differences among each of the five variables. No consistent trends resulted from analysis of the data. Films contributed more to achievement in larger classes (as defined in the experiment) than smaller classes. Teacher training in the use of audio-visual materials did not affect achievement made by the students. The author points out this may be only a reflection of the quality or emphasis of the training course, or a contamination of teacher training in the experiment. Films may be less effective in small schools (as defined in the experiment) than in large.

Allen, M. R. *Quartermaster Training Command Education Television Study*. Fort Lee, Virginia: Quartermaster School, Quartermaster Training Command, 1954. (Duplicated)

[Prepared from abstract in Kumata, Hideya. *An Inventory of Instructional Television Research*. Ann Arbor, Michigan: Educational Television and Radio Center, 1956. p. 32.]

Problem: feasibility of mass teaching by TV.

Sample: 107 college students, 42 Army reservists.

Subject taught: Army Food Service.

Key variables: TV teaching, face-to-face teaching, student attitude inventory.

Purpose of the experiment was to explore the feasibility of teaching Quartermaster Corps subjects via TV using low-cost methods. A course of four hours was selected -- "Food Service Activities in the United States Army" -- and telecast over KUHT to ROTC students and a small group of reserves. Forty-seven ROTC students received the instruction via TV and 60 ROTC students received face-to-face instruction. Out of 500 reserves notified about the series, 42 participated. The same instructor, instruction and scripts were used for any one day's presentation. The TV students were split into three classes as were the non-TV students. Thus in any presentation, five such lectures were given; three different classroom hours, one TV presentation to two classes of TV students (viewing in different rooms) and an additional TV presentation for the third TV class. Another small group, not included in the analysis, viewed some of the lessons on TV and received the rest of the instruction in the regular classroom. All students took a 32-item multiple-choice and true-false examination four days after the conclusion of the four-hour course. The TV students executed an "acceptability" questionnaire on the use of TV. The reserves who viewed the program completed a survey questionnaire.

Out of a possible score of 32, the regular classroom method students scored 27.7 and the TV students 26.5. The author states that there was a very slight difference between the two groups favoring the classroom group, but that when comparing the academic standings of the two groups, the classroom group was higher than the TV group. This, the author states, could account for the difference between the two groups.

The ROTC TV students replied on the "acceptability" questionnaire that the TV lessons were about the same or more interesting than other Reserve ROTC training periods. Eight out of 53 thought the hours dull.

From a learning point of view, 31 thought the material was about as easy to learn when presented on TV as compared with classroom instruction; 11 thought learning was easy or very easy; and 11 thought learning by TV was difficult.

Most of the students thought one hour was the maximum for any TV session. Other comments by the students were generally favorable. Reserve officers rated the programs superior to very good. Seven rated the programs as fair. None rated them as poor. Comparing the programs to regular reserve training periods, 24 believed the TV programs were much more interesting, or more interesting and 17 felt they were about the same. Thirty-four found the live TV programs were instructive or about the same value as the average training film while seven believed the TV programs to be less instructive. Other written comments were generally favorable.

Allison, Sarah G. and Philip Ash. Relationship of anxiety to learning from films. Instructional Film Research Reports. Port Washington, Long Island, New York: U. S. Naval Special Devices Center, 1951.

Problem: Will mild concern of a student to learn result in increased learning?

Sample: 480 college students.

Subject taught: Introductory Psychology.

Key variables: Anxiety level inventory, anxiety lowering instructions, neutral instruction, anxiety increasing instructions, film content test.

Four hundred eighty students were tested to determine how well they learned under different degrees of motivation to learn. One group of students was given instructions to decrease motivation (lower anxiety), one group given neutral instructions, and one group given instructions to increase motivation (increase anxiety), and one group was given test without seeing film to serve as control group.

Prior to viewing the films an inventory to measure chronic anxiety was administered. There was no significant difference in chronic anxiety in the four groups. The films were presented as part of a regular college course in Introductory Psychology.

Two films were shown to groups. First group N = 237, second group N = 243.

Results: Scores on test of film content were:

INTRODUCTION GROUPS	FILM I	FILM II
No Film	38%	35%
Anxiety decreasing	53	49
Neutral	56	51
Anxiety increasing	61*	56*

The authors conclude (1) the films did teach some material, (2) increasing anxiety uniformly increased scores on test of material in the film, and (3) there was no relationship between chronic anxiety scores and scores on film learning.

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*Difference of anxiety increasing over neutral instruction significant at .03 level. Anxiety increasing over anxiety decreasing introduction significant at .01 level.

Almstead, Francis E. and Raymond W. Graf. Talkback: the missing ingredient. Audio-Visual Instruction, (April, 1960), 110-112.

Problem: comparative effectiveness of TV and face-to-face instruction.

Sample: not given.

Subjects taught: geometry, reading achievement.

Key variables: learning from TV instruction, face-to-face instruction; scores on New York State Regents Examination, scores on Iowa Test-Basic Skills-Form II.

GEOMETRY

Comparison of grades on the New York State Regents Examination for two groups (not specified) who received total teaching by TV for one group and face-to-face teaching for the other group. Groups were students in Cortland, New York vicinity and matched on unspecified variables.

	TV	Face-to-face
Per cent passing	85	76
Per cent scoring 90 or above	31	15

READING ACHIEVEMENT

This article reports on a study by William Sheldon involving children in Cortland, Truxton, and Virgil, New York, who were taught reading achievement by talkback-equipped TV and compares their scores on the Iowa Test, Basic Skills, Form II, with students in Fulton, New York, who were taught reading achievement by face-to-face methods. Talkback TV involves a feedback system from the classroom to the studio which can be operated by the students in the classroom or the teacher in the studio.

2--Almstead, Francis E. and Raymond W. Graf

The students in Fulton while having higher IQ scores before instruction, scored significantly lower on the criterion in five out of six comparisons. The results were

Grade	Test	TV		Face-to-face		Difference	"t"
		Score	Gain-Mos.	Score	Gain-Mos.		
4	Vocabulary	5.507	11.415	5.022	6.510	4.905	4.525***
	Comprehension	5.229	8.603	5.264	6.614	1.989	1.791*
	Mean Total	5.404	10.117	5.158	6.479	3.638	4.660***
6	Vocabulary	7.719	11.773	7.198	7.771	4.002	3.272***
	Comprehension	7.307	7.773	7.162	6.710	1.063	0.807
	Mean Total	7.494	9.835	7.135	7.000	2.835	2.814**

* p = .05 level of significance (one-tailed test)

** p = .01 level of significance (one-tailed test)

*** p = .001 level of significance (one-tailed test)

This article also contains a descriptive report of the talkback-equipped televised instruction system in operation at Cortland, New York.

Ambrosino, Michael J., William H. Dunstan and Bernard F. Haake. The Schenectady experiment. Schenectady: Schenectady Public Schools, 1956. Audio Visual Communication Review, 5 (1957), 557-558. (Abstract)

Problem: determine the effectiveness of learning by television.

Sample: 215 students.

Subjects taught: mathematics, chemistry, English and French.

Key variables: television presentation, learning.

Achievement test scores of students in instudio classes were about the same as those of students in television classes.

Amirian, Gerard Thomas. The retention by elementary school children of natural science material and of science attitude and interest changes following a program of science teaching by television. Unpublished Doctor's dissertation, Boston University, Boston, 1962. (See also study by Gerard T. Amirian and Ralph Garry, USOE Grant Number 719114. Boston: Boston University, November 1, 1961. [Mimeographed] Compare studies by A. Cornelia Sheehan and Mary E. Kraft.)

Problem: evaluate effects of teacher training, television and face-to-face presentation, and pupil activity in fifth-grade natural science, by achievement and attitude.

Sample: 1600 pupils from 90 fifth-grade classes in 23 Massachusetts towns who were a part of the same sample used in an earlier study. (The Sheehan and Kraft study had 2600 pupils.)

Subject taught: natural science.

Key variables: presentation of ITV (30 half-hour classes) as initial or final segment of daily lesson; study guide or none; teacher training in science, in instructional television, or none; class assignment or individual pupil project; retention, vocabulary scores, and attitude.

Seventy-two fifth-grade classes were randomly assigned to one of 24 experimental treatments resulting from combinations of the four independent variables listed above. In this follow-up study of the parent study, half of the pupils were tested four months after the parent study, and half were tested eight months afterwards. All students took four specially constructed instruments: a science vocabulary test, a science information test, an interest inventory and an attitude scale. The attitude instrument had 60 statements each beginning with "A scientist is someone who . . . ." Pupils responded with true, false, or don't know. The interest inventory (K-R r = .97) determined pupils' interests in science, mechanical, athletic, literary, and humanitarian areas. The science information test had 75 multiple-choice items and had a split-half r of .74, corrected (Spearman-Brown) to .86. The 150-

item science vocabulary test had a split-half r of .96, corrected (Spearman-Brown) to .98.

Gains as measured by scores on the information and vocabulary instruments that had been observed in earlier studies were retained and increased four and eight months later. There were no significant differences between experimental (TV) and control (non-TV) groups in science retention or science interest and attitude. There were no significant differences as a result of teacher training, or using ITV to begin or to end the lesson each day. The only difference in terms of class assignment or individual project was in attitude questionnaire scores, with a gain resulting for class assignment. High IQ groups significantly had greater losses in science interest than low groups, and females significantly greater losses than males. There were no significant differences among the IQ groups in attitude and interest between experimental and control groups.

Anderson, George R. and Abram W. VanderMeer. A comparative study of the effectiveness of lessons on the slide rule presented via television and in person. Mathematics Teacher, 47 (1954), 323-327.

Problem: comparative effectiveness of television and face-to-face teaching.

Sample: 105 high school students.

Subject taught: slide rule operation.

Key variables: learning, TV teaching, face-to-face teaching, intelligence, arithmetic achievement.

Five classes of high school sophomores were taught operation of a slide rule by television and face-to-face methods of instruction. Three classes were taught in their regular classrooms by open-circuit television. The other two classes were taught the same material by the same teacher the TV group had. Six half-hour periods of instruction were given to both groups over the six-week experimental period. Before instruction, all students were given the California Test of Mental Maturity and the Stanford Achievement Test in Advanced Arithmetic. On the basis of these tests, two matched groups of 41 students each were selected. While all students in all groups were taught the same material, only the performance of the two matched groups was compared. This comparison was made on the basis of six weekly tests given after each period of instruction and a final examination administered after the six-week period. There was no significant difference in intelligence or arithmetic achievement for the two groups before instruction, but the face-to-face group had a slightly higher score in intelligence and arithmetic achievement.

Results. There was no significant difference between the scores of the combined tests and final examination for the two methods of instruction, but the raw score averages did favor the face-to-face group. There were no significant differences in learning between methods of instruction for sex, intelligence, or previous arithmetic achievement. As measured by the difference in the sum of the weekly tests and the final examination, the TV-taught group forgot significantly more than the face-to-face taught group.

Conclusions. TV is an equally effective, compared to face-to-face, means of instruction in teaching slide rule operation.

Anderson, Kenneth E. et al. Toward more effective use of sound motion pictures in high school biology. Science Education, 40 (1956), 43-54.

Problem: comparative effectiveness of film and face-to-face teaching and face-to-face teaching alone.

Sample: 1354 high school students in 60 schools.

Subject taught: high school biology.

Key variables: learning, face-to-face teaching, film teaching, film teaching with supplementary face-to-face instruction.

Twenty science teaching films were selected by authors to be in conformity with criteria by W. Edgar Martin of the major principles of biological sciences for importance to general education. Three groups of students were selected from Kansas high schools. Group I was a control group which was taught biology face-to-face by their regular instructors in the way they regularly teach the course. Group II saw the 20 films as part of the regular biology instruction, but no effort was made by the classroom teachers to point out special parts of the films. Group III saw the films as part of regular instruction, but classroom instructors pointed out and stressed, according to material supplied with the films by the authors, the principles covered or stressed in the films.

Students were pretested on the Nelson Biology Test, Form Am before instruction began, posttested on the Nelson Biology Test, Form Bm, and given the Terman-McNemar Test of Mental Ability, Form C, during the middle of the year.

Results were analyzed by analysis of covariance, adjusting for intelligence, and by comparison of posttest and pretest variances. The authors conclude that (1) holding intelligence constant, there were no significant differences among the methods of instruction, (2) adjusting for intelligence, a significant difference favoring the students taught by films plus stressed principles was noted for high- and low-ability students (but there were no significant differences for middle-ability students); and (3) the greatest increase in variance from pretest to posttest occurred with the students taught by films plus stressed principles.

The authors state the implication that film producers should provide a description of the principles, according to Martin's criteria, that are stressed in each film.

Andrews, John J. High school algebra via television. The Mathematics Teacher, 8 (May, 1960), 376-378.

Problem: effectiveness of TV teaching.

Sample: 464 students.

Subjects taught: intermediate high school algebra, advanced high school algebra.

Key variables: learning, TV teaching, teacher opinions.

Students in 23 schools received instruction via open-circuit TV. Telecasts were 30 minutes long for four days a week. Follow-up sessions were presented face-to-face at the schools immediately after telecast.

Achievement results. At end of each semester an objective test was given to all students. The intermediate algebra class median score was the 60th percentile on the Garman-Schrammel Algebra Test. The advanced algebra median score was the 90th percentile on the Blyth Second-Year Algebra Test.

Opinion Questionnaire Results. (1) Liked best in the experiment was (a) same outline used for all schools, (b) TV lesson required more student attention, (c) all students received identical instruction. (2) Liked least about the experiment was (a) no personal contact between TV teacher and students, (b) no ability to ask questions of TV teacher during program.

(Study also contains description of project and its administration.)

Ash, Philip and B. J. Carlton. The Value of Note-taking during Film Learning. SDC-269-7-21. Instructional Film Research Reports. Port Washington, New York: U. S. Naval Special Devices Center, 1951.

Problem: effect of note-taking during film viewing on learning from film.

Sample: 216 freshman college students.

Subjects taught: High Altitude Flying, Ocean Survival, and Safety.

Key variables: no film viewing; film viewing only; film viewing and note-taking; film viewing, note-taking, and review sessions; scores on test of film content.

Two hundred sixteen students were divided at random into four equal groups. One group was shown two films and tested on the film content immediately after viewing. The second group was shown the film, took notes during the film, and tested immediately after viewing. The third group saw the film, took notes, reviewed their notes for ten minutes, turned in their notes, and then took the test. The fourth group did not see the film, but took the test.

The results were (1) the students learned from the films. Average per cent of test items correct for the three groups that saw the films was 60 per cent while the average per cent correct for the no-film group was 30 per cent. (2) The film-only group earned the highest average score of the three film groups (see table of mean scores below):

GROUP	FILM	
	Flying	Survival
Film only	61.8%*	71.7%
Film + notes + review	60.7	63.0
Film + notes	57.6	59.1

*Significant at .001 level.

Authors conclude that note-taking interfered with learning because films did not have pauses and repetition necessary for note-taking.

Ash, Philip and Nathan Jaspen. Optimum physical viewing conditions for a rear projection daylight screen. SDC-269-7-37. Instructional Film Research Reports. Port Washington, New York: U. S. Naval Special Devices Center, 1953.

Problem: defining viewing parameters of a small motion picture screen.

Sample: 721 trainees at Great Lakes Naval Training Center.

Subject taught: Breech Block Assembly for 40mm Anti-aircraft Gun.

Key variables: angle of view, distance from screen, room illumination.

To determine the most effective placement of students in front of a rear screen daylight projection device for viewing an instructional film, 721 trainees were taught the assembly of a 40mm anti-aircraft gun breech block.

The screen of the projection system is 13" x 18" made of special plastic material which will allow for wide viewing angles. Previous viewing standards for conventional front screen projection had been established by the Society of Motion Picture and Television Engineers as having no seats further away from the screen than six times the distance from center to the edge of the screen.

To study the effect of angle of view and distance from the screen a special viewing room was set up. Arcs were drawn at 6-foot intervals from the projector, set in a corner, and radii were extended at intervals of 0° through 60°. Seats were arranged along these arcs. The viewing area was therefore a pie-shaped sector, one-sixth of a circle. In all, 50 seating positions were studied.

The same film on the assembly of the breech block was shown to all trainees. Half of the population of 721 men were tested under daylight conditions and half under darkened room conditions. An average of seven men for each position for each condition of lighting was available.

Following the film showing, the men were directed to testing stations at long tables arranged in the room. Each table had four to six test stations where a breech block, set-up photograph, stop watch, pencil and oil rag were placed. A proctor was assigned to each station.

Proctors were trained to set up disassembled breech blocks in a standard manner, operate stop watches, and record data.

When trainees reached the test stations, a signal to begin assembling breech blocks was given. When a man completed assembly or the time allotted for the completion was past, the test was stopped and scores for correct assembly given.

Results. The authors found a downward trend for correct assembly as angle to receiver and distance from receiver increased. They also found that in the best viewing areas, daylight operation resulted in better and faster assemblies, but as viewing distance and angle increased, performance was better under conditions of darkness.

The optimum area for viewing this device was a cone 60° wide and 18 feet deep (12 screen widths). Performance of those who sat in this area was significantly better than those who sat outside this area.

In the optimum area, daylight operation is best, but outside this area, darkness is best. Therefore, if a substantial part of the audience is outside, the optimum viewing area of the room should be darkened. If the optimum area is to be extended, increases should be in angle to screen rather than distance to the screen.

Ash, Philip and Nathan Jaspen. The effects and interactions of rate of development, repetition, participation and room illumination on learning from a rear projected film. SDC-269-7-39. Instructional Film Research Reports. Port Washington, Long Island, New York: U. S. Naval Special Devices Center, 1953.

Problem: effect of viewer participation on learning from instructional films.

Sample: 1,100 trainees at Great Lakes Naval Training Center.

Subject taught: Assembly of the Breech Block of the 40mm Anti-aircraft Gun.

Key variables: rate of development of content, room lighting, repetition, viewer participation, viewing.

This study undertook to investigate the effect on learning of four variables in film representation. One thousand one hundred trainees were taught how to assemble the breech block of a 40mm anti-aircraft gun by an instructional film. Two versions of the film were used. The first version presented the step-by-step assembly at a rapid pace, the second presented the assembly at a slow pace. The film's first version running time was three minutes, the second version ran four and one-half minutes.

To study the other effects, three variables of film presentation were used: (1) Amount of light in the room was varied. (This technique was possible with the rear screen because the projection screen is quite bright.) The light varied from full darkness to bright daylight. (2) The films were shown one, two, or three times to study the effect of repetition. (3) Audience participation was studied by allowing some groups to follow the film showing of the correct assembly with an actual breech block in their hands while others had to wait until the film was over to try and assemble the actual breech block. All together, twenty possible combinations of the four treatments were tested.

Trainees were divided into groups of about 60 and shown the film under the appropriate combination of variables. After the film showing(s), they went to tables in the viewing room and assembled an actual breech block.

Trainees were scored on the amount of time necessary to make a correct assembly; therefore there were two scores for each subject, a pass or fail score and the amount of time necessary for completion of the assembly if the student passed.

Data analysis was by analysis of variance of the two scores for 20 separate interactions.

Findings. The authors summarized the findings for each variable as follows:

2--Ash, Philip and Nathan Jaspen

1. Rate of development. The slow film was appreciably better than the fast film in all comparable conditions. The rate of development had a significant effect on repetition and participation.

2. Room illumination. A dark room resulted in significantly better performance than a light room over all comparable conditions. Room illumination did not appear to interact with other variables, but it did have an effect on distance from the screen.*

3. Participation. Participation was helpful with the slow film and detrimental with the fast film. The positive contribution of participation was significantly greater with slow film than the negative contribution with the fast film.

4. Repetition. For the slow film significant contributions for repetition were found only for the second showing. The third showing of the slow film had little effect. With the fast-paced film three showings were necessary for a significant increase in learning and the second showing resulted in only slightly better performance.

Implications. The authors implied that: (1) a slow rate of content development is more helpful to learning than a fast rate, (2) repetition showings of a film increase learning to a point, (3) participation by viewers increases learning provided development is paced slowly enough to allow participation. Attempted participation with a fast film impedes learning.

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*This study reconfirms a relationship between illumination, distance from screen and learning the same authors noted in another study. This relationship, briefly stated, is that learning is high in a well-lighted room using a rear projection screen only when viewers are not further from the screen than 12 times the width of that screen. If viewers are further than 12 screen widths away, a darkened room results in more learning. See: Ash, Philip and Nathan Jaspen. Optimum viewing conditions for a rear projection daylight screen. SDC 269-7-37. Instructional Film Research Reports. Port Washington, New York: U. S. Naval Special Devices Center, 1953.

Asher, James J. and Richard I. Evans. An investigation of some aspects of the social psychological impact of an educational television program, Journal of Applied Psychology, 43 (1959), 166-169. (Also unpublished Doctor's dissertation, University of Houston, Houston, 1957).

Problem: to explore the viewer's change in attitudes after viewing an educational television program, as a function of viewer rigidity, prestige of the agency transmitting the program, and adaptation level.

Sample: undergraduate college students (N = 113) some of whom believed the program to be a network production (N = 47), others who believed the program to be a local broadcast (N = 36), and the control subjects (N = 30).

Subject taught: The program communicated through modern dance how different cultures react to puberty changes in girls.

Key variables: attitude changes after an ITV presentation, viewer rigidity, prestige of the message's source, and adaptation level.

In this study three hypotheses were tested. The first hypothesis was that the greater the rigidity or "close mindedness" of the audience, the less change in attitude from an educational television program. The second hypothesis was that a local program would have less influence on attitudes than a network program, and the third hypothesis was that the audience would have a more positive feeling for the program as a function of adaptation level.

The first idea was tested by relating a measure of "close mindedness" (Rokeach's dogmatism scale), to attitude changes (as measured by the semantic differential), when undergraduate college students (N = 83) viewed an educational television program on how different cultures react to puberty changes in girls. Generally, the measure of "close mindedness" did not correlate with attitude changes produced by the program.

The second hypothesis was that if the viewers believed that the program had been produced by a television network rather than a local educational station, there may be greater attitude change in the audience as a function of higher prestige This hypothesis was not supported. Whether the viewer believed the program to be network or locally produced, there was a significant change in the same set of attitudes.

The third hypothesis stated that since the program did not have the quality of a network production, viewers who believed that the program was local would be more satisfied than viewers who believed the program to be a network production. This notion was based on adaptation level theory which would predict that less deviation from what is expected will produce positive feeling. The hypothesis was supported.

Bailey, Herbert Sternbergh. Teaching physics on closed circuit television. Unpublished Doctor's dissertation, Syracuse University, Syracuse, 1958.

Problem: determine the effectiveness of learning physics by television and to determine student attitudes toward an ITV physics course.

Sample: 40 university students taking physics.

Subject taught: General Physics.

Key variables: ITV and face-to-face presentation; achievement and attitudes.

Subjects were matched by grade-point average and sex, and were randomly assigned to a television or non-television group. A 78-item multiple-choice pretest was administered. Means on this pretest did not differ significantly. The same test was also incorporated into the final examination. Posttest means were not significantly different between the two groups either. Differences in achievement scores between the groups were not significant. As measured by scores on the physics achievement test, students achieved as much by closed-circuit television as they did by face-to-face methods. The course made maximum use of available visual materials.

Student reactions on an attitude questionnaire given at the end of the course were not favorable to ITV. Students felt that achievement, retention, and final grades would be lower in the ITV section. They disagreed that ITV had fewer distractions and helped them concentrate better. They were about equally divided on whether they thought ITV allowed them to view demonstrations more closely. Thirteen of twenty-one indicated they disliked the course; sixteen indicated they preferred a face-to-face class, and twelve indicated they would prefer ITV to a large class of several sections. Perhaps part of the students' unfavorable reaction to ITV was due to technical difficulties -- poor sound and bad quality pictures.

Barrow, Lionel C., Jr. and Bruce H. Westley. Comparative teaching effectiveness of radio and television. Audio-Visual Communication Review, 7 (1959), 14-23. See Westley, Bruce H. and Lionel C. Barrow, Intelligence and the effectiveness of radio and television. Audio-Visual Communication Review, 7 (1959), 193-208.

Beatts, Patrick M. Report on instructional closed circuit television for 1957. IBM, Poughkeepsie, New York, February 1, 1957. Audio-Visual Communication Review, 7 (1959), 306. (Abstract)

Problem:	determine the teaching effectiveness, student and teacher acceptance, efficiency, and other aspects of closed-circuit television instruction.
Sample:	customer engineering students.
Subject taught:	IBM machines.
Key variables:	students' grades, students' and teachers' questionnaire responses, and students' attitudes over time.

It was concluded that teachers and students became increasingly more favorable to instructional television, and that a reduction in the class time spent was feasible. Secondary result was both the observed, and subjectively reported improvement in preparation and teaching ability in the conventional classroom of the instructors who used TV.

Becker, Samuel L. The "meaning" of ITV: A study of student expectations. NAEB Journal, 22 (1963), 25-31.

Problem: determine expectations of students toward ITV and attitudes toward other university experiences.

Sample: 594 entering Iowa freshmen; 190 freshmen, 280 sophomores, 276 juniors, and 183 seniors at the end of the year.

Key variables: attitudes, attitudes over time, and year in school.

594 entering freshmen took a semantic differential instrument ("University Image Test") having 18 concepts (Education, Professor, Courses, Library, Dates, Athletics, etc.) and 14 7-point bi-polar adjectives. 929 students took the instrument at the end of the year. None of the students were enrolled in a college ITV course.

Scores on the concept Use of TV in College Courses were consistently lower than scores on concepts such as Education, Professor, or Library.

When all adjectival scales were intercorrelated, two clusters were found: an Intellectual-Utility cluster (having scales intelligent-stupid, high standards-low standards, adult-childish, useful-useless, and practical-impractical) and a Warmth cluster (having scales pleasant-unpleasant and friendly-unfriendly).

Students' rankings of all the concepts except Television on the Intellectual-Utility and Warmth clusters tended to become more unfavorable with greater university experience. For the Television concept there was not the favorable to unfavorable trend from the freshmen to seniors.

On the Intellectual-Utility cluster, the Television concept correlated at least .57 with all other concepts except Coaches. On the Warmth cluster, it correlated most closely with Regulations, the University of Iowa, Harvard, Education, Grades, and the Liberal Arts Dean. It correlated negatively with Dates, Athletics, Dorms, and Degree.

Becker, Samuel L. The relationships of interest and attention to retention and attitude change. USOE Project Number 739. Iowa City, Iowa: University of Iowa, 1963. Audio-Visual Communication Review, 12 (1964), 110-111. (Abstract)

Problem: determine the relationship among interest, GSR, retention, and attitude change.

Sample: 90 fifth-grade students.

Subjects taught: the Constitution and the Story of the U.N.

All students individually saw the two recorded 30-minute TV programs. Students in group one pushed a switch when they thought the program was "dull" and released it when they thought the program was "interesting." Students in group two checked a paper chart every 30 seconds to indicate interest. Group three students were tested for GSR. All students took a factual test before and after viewing each program.

The push-button and pencil and paper groups showed similar profiles but neither had any relationship to the GSR profile. Retention and the three measurements were unrelated. GSR scores showed more relationship to attitude and attitude change than retention.

Becker, Samuel L., Rhodes Dunlap and John C. Gerber. A comparison of three methods of teaching Modern Literature. Iowa City: The State University of Iowa, June, 1957. (Mimeographed)

Problem: determine the attitudes of students and teachers toward the use of ITV and determine the relative learning from ITV and face-to-face presentations.

Sample: about 360 students in the discussion section, about 150 students in the lecture-discussion section, and 73 students in the ITV section.

Subject taught: Modern Literature.

Key variables: attitudes, learning (final grade in the course); ITV and face-to-face presentations.

Discussion sections of about 30 students each met four days a week with one teacher. Lecture-discussion sections met twice a week for lectures, and twice a week in groups of about 20 for discussion. The discussion leader was usually not the lecturer. The television-discussion sections met two days a week for a lecture, and two days a week in which part of the group discussed in the studio with the instructor, and the rest of the group watched. Viewing students had a talk-back system available, but experimental conditions were such that discussion with any but members of the immediate panel was in effect impossible.

After the course, students filled in an attitude questionnaire. Generally, the television group was least favorable to the course and the discussion group was most favorable. Television students tended to be more favorable toward using ITV than did students in the other two groups. Discussion students felt they learned more and were stimulated to more thought than television students. Fifteen of 20 Modern Literature instructors filled out an attitude questionnaire. This faculty group was more negative toward a "lecture only" course than students were.

There were no significant differences among scores of students in the three groups on four multiple-part essay questions (final examination grades).

Becker, Samuel L. et al. Communication skills. An experiment in instructional methods. Iowa City: The State University of Iowa, August, 1958.

Problem: determine the relative effectiveness of face-to-face, assigned readings and kinescope instruction.

Sample: 582 students in the main course.

Subject taught: Communication Skills.

Key variables: learning and attitudes; face-to-face, assigned readings, and kinescope instruction presentation.

Students were randomly assigned to one of three treatment groups; face-to-face instruction, a bibliography group which met three rather than four hours a week and which read a list of assigned material, a kinescope group which saw 28 half-hour kinescopes presented by "experts," in addition to about three face-to-face lectures each week. Kinescopes were projected as motion pictures. Only the first two treatments were available for the accelerated students (who had gotten higher scores on an initial placement examination battery).

All students in the accelerated course filled in an attitude questionnaire near the end of the first semester, and students in the main courses filled in a similar questionnaire at the close of the second semester. Communication Skills instructors filled in a questionnaire to ascertain which method they believed was most beneficial and why.

For the main course students, analysis of covariance showed significant instructor differences for all but the vocabulary measures. Using either combined scores or individual scores as the unit of measurement, F ratios indicated no significant differences among treatments on the English composition, reading, vocabulary, communication skills principles, or Brown-Carlson listening tests; an expository theme, or an argumentative speech. In addition, analyses of covariance in a treatment by levels design (dividing percentile rank on the entrance composite examination into four levels) on the principles, speech, theme, and listening examinations after the course indicated no significant F ratios for methods of instruction or interaction for the principles, speech, or listening examinations. For the levels analysis of theme scores, a significant F ratio was found between levels and methods of instruction (face-to-face, bibliography, and kinescope). Within all four examination score analyses, significant differences were found among the four levels.

Analyses of variance on the attitudes toward communication measures at the end of the course indicated no significant differences between instructors within each method or between methods of instruction. Students in each of the three treatment groups favored their method of instruction, generally regarded it as easier than the other two methods, and felt they would gain the most from it.

Almost no correlation was found between pre-attitude scores and achievement gain scores. Communication Skills instructors generally felt students made the most progress under the normal face-to-face condition.

Benner, Charles P. and Curtis A. Rogers. A new plan for instructing large classes in mathematics by television and films. The Mathematics Teacher, 53 (May, 1960), 371-375.

Problem: comparative effectiveness of TV, face-to-face, and film teaching.

Sample: 1,132 students in four semesters.

Subject taught: plane trigonometry.

Key variables: TV teaching, film teaching, face-to-face teaching, learning.

Students received instruction by viewing two televised lectures on open-circuit TV each week, plus two optional repeat showings of the lessons as film, and a one-hour a week face-to-face discussion section. All TV programs originally were made on the campus as film lessons and shown later over the TV station. Student achievement was measured on two major and two minor examinations given during the semester.

As an evaluation technique the authors found that a preliminary observation of IQ scores, comprehensive reading test scores and course letter grades of 250 students who had taken the course indicated a distribution of A to F grades in the course for the range of IQ and reading scores. The Educational Testing Service Cooperative Plane Trigonometry Test was administered for four semesters with norms of 55.4, 56.9, 57.4, and 57.2 respectively and the national norm is 57. For comparative performance with face-to-face taught students the following data were tabulated for one semester.

	Grades Given					
Method of Instruction	N	%A	%B	%C	%D	%F
TV	80	10	24	42	15	9
Face-to-face	108	14	21	31	18	16

(Study also reports on the development and administration of the project from inception in 1957 to Spring, 1959.)

Benschoter, Reba Patterson and Don C. Charles. Retention of classroom and television learning. Journal of Applied Psychology, 41 (1957), 253-256.

Problem: comparative effectiveness of TV and face-to-face teaching measured in terms of long-term retention.

Sample: 83 students.

Subject taught: psychology.

Key variables: TV teaching, face-to-face teaching, combined face-to-face and TV teaching, TV recording teaching, retention measured over three years, learning.

This study, based on Husband's* experiment of 1953, attempted to analyze three-year retention of psychology subject matter of students taught by TV and face-to-face methods. A readministration of the final examination given in 1953 was compared to original scores to give a measure of retention.

Results. (1) A comparison of the main differences among the four groups, TV taught, face-to-face taught, studio (combined TV and face-to-face) taught, and kinescope recording (used as a film) taught, showed no significant difference in amount remembered by the groups (mean differences were -12.9, -11.6, -10.3, and -14.4 respectively). (2) When the campus students were categorized according to number of psychology courses taken since original instruction in 1953, there was a significant interaction. Those who had taken three or more psychology courses scored higher on the retention test than those who had taken, no, one, or two classes in psychology. When TV-taught students only were categorized on basis of number of psychology courses taken, there was little difference in retention between those with few courses and those with three or more courses. (3) Students with lower original test scores lost less over the three years than students with higher original test scores.

Conclusions. Students taught by TV retain their material over three years as well as students taught by face-to-face methods of instruction.

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*See R. W. Husband. Television versus classroom for learning general psychology. American Psychologist, 9 (1954), 181-183.

Berger, Emil Joseph. An investigation of the effectiveness of televised presentations of self-contained television-adapted lessons on enrichment topics in mathematics. Unpublished Doctor's dissertation, University of Minnesota, Minneapolis, 1962.

Problem: determine the relative effectiveness of televised and face-to-face presentations of enrichment mathematics topics, and determine any differences by ability level.

Sample: 154 ninth-grade algebra students from five classes, 57 tenth-grade geometry students from two classes, plus 58 tenth-grade geometry students from two classes (control group).

Subject taught: mathematics.

Key variables: ability, learning, television and face-to-face presentation.

Eight lessons were prepared. Before and after each lesson, subjects took a multiple-choice achievement test.

Students in television sections had significantly higher scores on the posttest than they had on the pretest, for each lesson.

Using the ninth-grade pupils, analysis of covariance technique adjusted for initial scores indicated that homogeneously grouped high-ability students had significantly higher scores than did high-ability students in heterogeneous classes in three of the seven lessons presented for this part of the experiment. Low-ability students in heterogeneous classes had significantly higher scores than did low-ability students in homogeneous classes for one lesson.

Using the tenth-grade pupils for seven lessons and pooling achievement scores, analysis of variance technique showed that students in the face-to-face sections had significantly higher scores than did students in the ITV sections on two lessons, and ITV students had significantly higher scores on one lesson.

Blain, Beryl Bruce. Effects of film narration type and of listenability level on learning of factual information. Unpublished Doctor's dissertation, Indiana University, Bloomington, 1956. Audio Visual Communication Review, 4 (1956), 162-163. (Abstract)

Problem: determine the relative effect of two types of film narration (expository and dramatic) on learning.

Sample: 330 fifth-grade pupils from six schools and 328 eighth-grade pupils from three schools in Pueblo, Colorado.

Subject taught: the Monarch Butterfly.

Key variables: expository and dramatic narration, learning.

Four prints of the same film were made and a magnetic stripe was put on each one. An expository narration of two difficulty levels was put on two films and a dramatic narration of two difficulty levels was put on two others.

All pupils took a 51-item test on the film content before and after the showing, and again a week later. Analysis of variance and covariance technique indicated no significant differences in scores of fifth graders in listenability levels or narration types. Eighth graders knew more, learned more, and retained more than fifth graders, as determined by the scores on content tests. Eighth graders learned more from the expository than the dramatic narration.

Blancheri, Raymond L. and Irving R. Merrill. The step presentation of dental technic instruction. Theo. S. Grant and Irving R. Merrill, Television in Health Sciences Education. USOE Project Number 064. San Francisco: University of California, San Francisco Medical Center, September 30, 1963. Pp. 34-37. (Offset)

Problem: determine the relative effectiveness of teaching crown preparation by ITV by one large step or several smaller steps.

Sample: 70 second-semester freshman dental students.

Subject taught: making a crown preparation on an ivorine tooth.

Key variables: step performance and whole lecture performance arrangement; time and quality of laboratory work.

Two groups were equated on mean scores of four dental morphology test scores (lab products). The inclusive group watched the entire ITV presentation and then prepared an ivorine tooth. The step group received step one, the mesial cut, and then performed that step, then received the second step, and so on for nine steps of about five minutes each.

Students' identification was concealed during the scoring of lab work products to avoid criterion contamination.

t-tests indicated the step presentation group did their lab work (test cases) in significantly less time than the inclusive presentation group (.01 level). There were no significant differences between the two groups in the quality of students' lab work.

Bobren, Howard M. and Sheldon L. Siegel. Student attitudes toward closed-circuit instructional television. Audio-Visual Communication Review, 8 (1960), 124-128.

Problem: compare students' learning and attitudes toward ITV and face-to-face instruction.

Sample: 112 male students at the University of Illinois.

Subject taught: engineering.

Key variables: learning, attitude; ITV and face-to-face presentation.

Students were assigned to face-to-face or ITV presentation treatments. Sections were taught by different instructors. Face-to-face students met in groups of 12 for their classes; ITV students (n = 60) assembled in one room to hear the ITV lecture, and then broke up into smaller groups.

At the end of the course all students took a semantic differential instrument and rated "Teaching where the instructor is in the classroom," "Teaching where the instructor is on television," "This course," and "Your instructor(s) in this course" on 11 polar adjective scales.

There were no significant differences in mid-term or final examination grades between the two groups. The ITV group reported they spent more [study] time outside of class than the face-to-face group. The television group rated the concept "This course" as less pleasant (.001 level), less clear (.001), less fair (.01), less good (.01), less meaningful (.05), less successful (.001), less wise (.01), less understandable (.001), less interesting (.05), and less simple (.05). The television group rated the concept "Your instructor(s) in this course" as less fair (.001), less valuable (.001), less clear (.01), less good (.05), less successful (.001), less meaningful (.01), less wise (.001), and less interesting (.05). Other scales for these two concepts showed no significant differences. There were no significant differences on any of the adjectives for the other two concepts, except for "Teaching where the instructor is on television," where the ITV group rated it less understandable (.01 level).

Boone, W. F. Evaluation of the U. S. Naval Academy Educational Television As a Teaching Aid. Annapolis: U. S. Naval Academy (7010 7-26-54), 1954. (Duplicated)

[Original unavailable to authors; prepared from abstract in Kumata, Hideya. Inventory of Instructional Television Research. Ann Arbor, Michigan: Educational Television and Radio Center, 1956. pp. 39-40]

Problem: to evaluate the U. S. Naval Academy's educational TV as a teaching aid.

Sample: six battalions of midshipmen at U. S. Naval Academy.

Subject taught: electronics.

Key variables: TV instruction, face-to-face instruction.

Two courses, "Transients in Electrical Circuits" and "Wave Shaping Circuits", taught midway in the second term were chosen as subject matter. Each course was 25 minutes long. The battalions of about 140 men each were split into two. While one-half received TV instruction, the other half received face-to-face instruction by their regular instructors. For the second course, the groups which received TV instruction were taught in the regular fashion while the face-to-face groups were exposed to TV.

Each student was given a prognostic pretest of ten minutes to determine initial learning level. Immediately after the lecture, the students were given a 15-minute achievement test. All questions were of the multiple-choice type. The pretest contained ten items, the achievement test contained 15 items covering both the material on the pretest and material covered in the lecture. Six weeks later, the achievement test was readministered.

Analysis of covariance was used. As measured by the pretest test scores, the TV group was not as well prepared as the face-to-face group for the class "Transients in Electrical Circuits". After exposure, the

TV group showed a significant superiority beyond the 1 per cent level over the face-to-face group. On the retention test, the TV group still scored higher although the difference between the two groups was not significant. In a comparison of regression coefficients of the two groups, the TV group had the smaller regression coefficients for both the achievement and retention tests. "This would seem to indicate that those instructed by TV had less dependence on their initial amount of knowledge. The poorer men gained more from TV than a comparable man gained from his regular instructor."

For the course "Wave Shaping Circuits" the pretest scores again showed the face-to-face group better prepared than the TV group. The difference again was not significant. In the immediate posttest, the face-to-face groups still remained superior. The difference between the face-to-face and TV groups on the achievement test was significant at the 5 per cent level. By the time of the retention test, however, this difference was obliterated. The TV group, in fact, did better than the face-to-face group although the difference was not significant. Regression coefficient comparisons showed that the TV group had a higher regression coefficient than the face-to-face group. The retention test showed a reversal for the TV group had a lower coefficient than that of the face-to-face group.

Brandon, James Roger. The relative effectiveness of lecture, interview and discussion methods of presenting factual information by TV. Speech Monographs, 23 (1956), 118. (Also unpublished doctoral dissertation, University of Wisconsin, Madison, 1955.)

Problem: determine relative effectiveness of lecture, interview, and discussion methods of instruction.

Sample: 144 college students (72 male, 72 female).

Subject taught: not applicable.

Key variables: lecture, interview and discussion instruction methods.

Nine instructional segments, each 10 minutes in length, were prepared on kinescope recordings by three speakers. Each speaker presented one of three different topics in three formats: (1) as a lecturer, (2) as an expert participant in an interview, and (3) as a participant in a discussion with another expert and a moderator. From these nine segments, 18 half-hour programs were arranged. Each program featured all three speakers and all three formats, but was arranged in different order of presentation.

Students were shown each program and then given an information and attitude questionnaire. Scores were converted into normalized scores and analyzed by analysis of variance.

The author concludes that the interview and discussion formats were more interesting than the lecture presentation in the course of the whole experiment. Females ranked lectures lowest in interest for all presentation, but males ranked one lecture more interesting than interview or discussion. The author also concludes that there was no significant difference in amount of information communicated by any of the presentation formats or arrangements. Females' scores were higher on the posttest information questionnaire, but they also scored higher on the information pretest. The least information was learned in the first ten minutes of presentation and the most information was learned in the middle ten minutes of presentation. Author states there was a low correlation between interest and amount of information retained.

Brown, James I. The Importance of Structured Outside Reading Assignments. College and Adult Reading, II, Second Annual Yearbook, North Central Reading Association, 1963.

[Abstracted in part in NAEB Journal, 21 (March, 1962), 5-7]

Problem: effectiveness of structured outside class reading assignments on improving learning from instructional television.

Sample: not given.

Subject taught: reading.

Key variables: gains in reading rate and comprehension for varying degrees and types of outside reading assignments, amount of structuring of outside reading assignments.

Part of the freshman communications program at the University of Minnesota involves the instruction of four communications skills of reading, writing, speaking, and listening. All incoming students are given a test of communication skills and assigned to a remedial section in any skill in which they are deficient. Historically, these special skills classes, also available to students on an elective basis, have produced highly significant gains in skill improvement for students. The author reports that below-average students have made an average percentile rank gain of 60 after instruction as measured on the Diagnostic Reading Test. During the years of this program's administration, various reading aids were introduced in the reading course. Students were tested to determine the comparative effectiveness of these aids. The students who showed the greatest gains in reading were those using a structured type of workbook as a reading aid. The move was made in the regular University face-to-face courses to a less permissive and more structured type of reading assignment.

During the period of adoption of the structured assignments, students were taught by five methods of instruction, a regular 10-week class, a summer 5-week class, a 17-week extension class, an industrial 12-week class, and an open-circuit television course of 12 weeks. The summer, extension, industrial and television classes featured less face-to-face instruction time than the regular face-to-face taught University campus course. Increasing the structure and frequency of the outside class reading assignments helped to keep the four other courses comparable in learning to the University course.

First TV Course. The Minnesota Mining and Manufacturing Company sponsored the first TV course over station KTCA-TV in 1960. This course featured some degree of structuring of the outside reading assignments. There were instructions for having the viewers make a preliminary and final check of flexibility, 47 selections to be read during the 12 weeks of instruction, and space for entering the pre- and posttest results.

At the end of the first series of programs, students who did three supplemental readings a week made, on an average, six times the gain in reading comprehension that students reading only one or fewer supplemental readings a week had made. The students who read more outside the class made a gain in rate five times greater than those who did not read outside class or read only one supplemental assignment each week.

Second TV Course. Based on the results of the first course, during the second course the number of assigned readings was increased from 47 to 60. An 11-page reading assignment sheet package was given to all students enrolled. Students were told what to do, how to do it, and when and where to report the results. In the previous course students were given a larger degree of permissiveness.

Students in this TV course did better than students in the previous TV course in terms of gains for both reading rate and comprehension, and, in fact, did better than students taught face-to-face in the 12-session industrial course, but gained less than the students in the 17-session extension course.

Conclusions. The author concludes that highly structured outside of class reading assignments can result in higher gains in reading rate and comprehension than can permissive assignments. The possibility is raised by the author that the structuring of the assignments may introduce a purpose other than to read more efficiently, specifically that of completing the assignments. This assignment completion task may introduce fear into some students of an attempt to increase rate because of a loss of comprehension. Students were taught how to determine the loss in comprehension for increase in rate to establish their own point of diminishing returns for rate increase. The author suggests further research be conducted into the role structured assignments play in producing gains in more efficient reading.

Bryan, Edward F. A comparative study in the teaching of high school chemistry and physics. USOE Project Number 447. Oklahoma City: Oklahoma State Department of Education, September, 1961. (Mimeographed)

Problem: compare achievement and attitudes of students receiving physics and chemistry by ITV and correspondence study, ITV and college students' visits, and ITV and both correspondence study and college students' visits.

Sample: 19 Oklahoma schools with 128 high school students in chemistry and 16 schools with 97 students in physics.

Subjects taught: chemistry and physics.

Key variables: television plus correspondence study; those who receive instruction by television plus personal visitation by college students preparing to teach; and, those who receive instruction by television plus both correspondence courses and personal visitations by college students preparing to teach.

The chemistry sample had 56 high school students in ITV and correspondence, 41 in ITV and visits, and 31 in ITV and both correspondence and visits treatments. The physics sample had 23, 42, and 32 in the same three treatments.

All students took the Read General Science Test as a pretest, and a (0.5) attitude questionnaire (constructed from questionnaires used by Neidt and French and Hibbs). Chemistry students took the Cooperative Chemistry Test as a posttest and physics students took the Ohio Every Pupil Physics Test as a posttest. Physics students saw the Harvey White Physics course and chemistry students saw the John Baxter chemistry course. Both were offered as films over television.

Analysis of variance run on the Read pretest scores indicated that the chemistry ITV plus visits group achieved significantly lower scores than the ITV plus correspondence group (.02 level). This was the only significant difference found initially.

Analysis of variance run on the Ohio Physics test indicated no significant differences among the three groups in (posttest) achievement scores. Analysis of variance on the ACS-NSTA Cooperative Chemistry Test scores indicated that the ITV plus correspondence plus visits group achieved significantly higher scores than either of the other two groups.

Analysis of covariance (holding Read scores constant) on the chemistry groups found regression coefficients of .48 and .62 for within and between groups, respectively.

Analysis of variance indicated chemistry students felt significantly more strongly about the questionnaire statements (.01 level) than did physics students.

Buckler, William E. A College English Teacher Looks at Television: Composition. Journal of Educational Sociology, 31:346-52 (1958).

Problem: comparative effectiveness of television and face-to-face instruction.

Sample: not given.

Subject taught: College English Composition.

Key variables: Cooperative English Test, Cooperative English Test of Literary Composition, student themes, TV teaching, face-to-face teaching.

A two-semester, six-credit hour course at Washington Square College of New York University was offered by closed-circuit television and face-to-face methods of instruction. TV sections met for 45 minutes of televised lecture and 30 minutes of face-to-face discussion twice a week. Both the TV and the face-to-face taught sections were taught by the same instructor.

The first semester's performance was compared on the basis of the CET and student themes, and the second semester's performance compared by the CETLC scores and additional student-written themes.

There was no significant difference between methods of instruction for students in either section during the first semester, but the adjusted mean scores favored the face-to-face section. During the second semester high-ability students in the face-to-face section did significantly better than high-ability students in the TV section. During the first semester low-ability students in the face-to-face section did better, but not significantly, than the low-ability students in the TV section.

Students in the TV section did better second semester than first semester, the author thought, because the students had made an adjustment to TV teaching, the subject matter adapted better to TV presentation, and less time was spent during the second semester discussing the merits of TV as a means of instruction.

Bundy, E. Wayne. An experimental study of the relative effectiveness of television presentational techniques and conventional classroom procedures in promoting initial comprehension of basic verb form concepts in elementary Spanish. Doctor's dissertation, University of Michigan, Ann Arbor, 1960. Published, Detroit: University of Detroit, August, 1959. [Mimeographed]

Problem: determine the relative effectiveness of television and face-to-face presentations in learning.

Sample: 38 Spanish I students at the University of Detroit.

Subject taught: elementary Spanish.

Key variables: television and face-to-face presentation; achievement.

Students were divided into two groups: one group had face-to-face instruction, and the other group had closed-circuit ITV, on three critical basic verb form concepts. The ITV presentation included the use of supers for emphasis. The same instructor taught both groups. After the first two concepts had been presented, the groups switched presentation methods for the third topic.

Statistical comparisons were made using three different tests. Of 24 comparisons made, 23 followed a consistent trend favoring television presentation techniques over conventional classroom procedures.

Burger, Elizabeth. The use of television for inservice teacher training. Unpublished Doctor's Dissertation, University of Virginia, Charlottesville, 1960.

Problem: determine whether pupils taught by teachers receiving science subject matter training by ITV learned as much as pupils taught by teachers not receiving subject matter training.

Sample: 34 teachers and 1039 fifth-grade pupils.

Subject taught: electricity and machines.

Key variables: learning; teachers receiving ITV instruction or no instruction.

All teachers were given a "Science Guide." Half the teachers also saw three half-hour ITV programs on science subject matter before class time.

All pupils took pre- and posttests on electricity and machines, as well as a general ability instrument.

_t_-tests indicated that pupils of teachers receiving the ITV instruction on electricity had significantly higher (.01 level) scores than pupils of teachers having no subject matter instruction. There were no significant differences in scores of pupils of teachers receiving ITV instruction on machines and scores of pupils of teachers having no instruction on machines.

Capraro, Thomas C. A study of the effects of class size, supervisory status, and two-way communication upon learning and attitudes of AFROTC cadets in a closed-circuit instructional television program. Unpublished Doctor's dissertation, Pennsylvania State University, University Park, 1956.

Problem: determine the effect of class size, proctor status and two-way communication on learning and attitudes toward ITV, and to determine the general pattern of cadet responses toward ITV.

Sample: 369 AFROTC cadets taking Air Science II.

Subject taught: Air Science II.

Key variables: class size, proctor status, two-way communication, cadet attitudes toward ITV over time, and learning.

To determine the effect of class size on learning and attitudes toward ITV, the total sample of 369 cadets was divided into groups of varying sizes from 19 to 110. An objective achievement instrument (two forms, r = .55 and .57) and an attitude questionnaire were administered. There were no significant differences between the various group sizes on learning or attitude toward television.

To determine the effect of proctor status on learning and attitudes toward ITV, four groups of 31 cadets each were selected. One group had a commissioned officer, one a cadet officer, one a fellow cadet chosen at random for each class meeting, and the last group had no proctor. Scores on an achievement test and responses to the attitude questionnaire revealed no significant differences between groups in learning or attitudes toward television.

To determine the effect of two-way communication on learning and attitudes, four groups of 30 cadets each were selected. Two groups had two-way microphones and two groups had no microphones. For this phase of the experiment, question-answer periods followed the lectures during which the experimental group could question the studio instructors. Scores on an objective achievement examination (two forms, r = .71 and .74) and responses to an attitude questionnaire designed to record reactions toward two-way communication and general reaction toward ITV revealed no significant differences between the groups in learning or in attitudes.

To determine the attitudes of cadets to ITV over time, questionnaires from those cadets for whom complete attitude data was available were examined. These revealed a consistently favorable reaction to the television course.

Carner, Richard Leland. An evaluation of teaching reading to elementary pupils through closed-circuit television. Unpublished Doctor's dissertation, Syracuse University, Syracuse, 1961.

Problem: determine the effectiveness of teaching reading to fifth- and sixth-grade pupils by ITV; determine if ITV remains effective over time, if ITV reduces a need for instruction according to ability, and what pupils' attitudes toward ITV are.

Sample: all fifth- and sixth-grade pupils in Cortland public schools.

Subject taught: fifth- and sixth-grade reading.

Key variables: reading ability, attitude, face-to-face and television presentation.

All pupils took the reading section of the Iowa Tests of Basic Skills. Superior readers made significantly smaller gains following ITV reading instruction than were made with face-to-face instruction the previous year. Average readers gained about the same under both conditions, and below-average readers made significantly higher gains from ITV. Average fifth-grade readers made as much improvement the second year of ITV reading instruction as they had the first. Superior readers receiving all reading instruction by ITV made as large gains as did superior readers who received part of their reading instruction by television and part by face-to-face instruction.

Pupils having an initially unfavorable attitude toward reading tended to become more favorable after the ITV reading instruction.

Teachers felt superior and average pupils benefited most. This contrasts with scores on standardized tests which showed the below-average students to benefit most from ITV reading instruction. Teachers' expectations of ITV reading instruction were greater than their final evaluations.

Carpenter, C. R. and L. P. Greenhill. Instructional Television Research. Project Number One. An Investigation of Closed-Circuit Television for Teaching University Courses. University Park: The Pennsylvania State University, July 31, 1955.

Problem: determine the relative effectiveness of ITV and direct presentations, and to determine students' attitudes toward ITV.

Sample: See below.

Subjects taught: psychology, chemistry, and psychology of marriage.

Key variables: learning and attitudes; face-to-face originating room and ITV presentations.

ACHIEVEMENT

Chemistry

Students were matched on college major and final grade in chemistry 1, and assigned to ITV, originating room, or control groups. There were 103 students in the originating room, 93 in TV classrooms, and 147 in the face-to-face lecture group.

Four analyses of covariance (run on each of the four achievement test scores and controlling on chemistry 1 grades) indicated no significant differences among the three groups. K-R #21 r's for the four achievement tests ranged from .80 to .92.

Psychology

Students were randomly assigned to treatments. There were 74 students in the face-to-face lecture group, 152 in TV classrooms, and 75 in the originating lecture room.

Four analyses of variance (run on each of the four achievement test scores) indicated no significant differences among the three groups, except for the second achievement test. For scores on the final examination, a significant (.05 level) F ratio was found between instructors. Reliabilities as estimated by analysis of variance for the four instruments ranged from .77 to .87.

Psychology of Marriage

There were 37 students in the originating room and 97 students in TV classrooms.

Three analyses of variance (run on each of the three achievement test scores) indicated no significant differences between the two groups. Reliabilities as estimated by analysis of variance for the three instruments ranged from .62 to .73.

ATTITUDES

Generally, students in psychology, psychology of marriage, and chemistry felt they learned about the same with direct instruction and over ITV classes. Students in the psychology direct lecture group tended to give that course more first ranks when compared with other courses than students in the originating room group who in turn gave it more first ranks than ITV students. The same order existed for how much students liked the course. There were no significant differences between control and experimental groups in the number of students signing up for Psychology 200. There was a significant instructor and treatment interaction. Students were found to be significantly less authoritarian (F-scale scores) after taking psychology than before.

Carpenter, C. R. and L. P. Greenhill. Instructional Television Research. Report Number Two. University Park, Pennsylvania: Pennsylvania State University, Spring, 1958.

Problem: determine the relative effectiveness of ITV and direct instruction on learning and on students' attitudes.

Sample: See below.

Subjects taught: psychology, chemistry, elementary business law, meteorology, music appreciation, and introductory sociology.

Key variables: face-to-face and ITV presentation; learning, retention, examination questions on textbook or lecture, distance from lecturer, class size, sex, proctor supervision, talk-back, attitude, and attitude over time.

Introduction

Throughout the study, analysis of variance and analysis of covariance were used where applicable. The level of significance adopted was .05. Assignment of students to treatments was random.

Learning and Retention

One hundred and fifty-two general psychology students were taught by ITV, 74 had direct instruction, and 75 were in the studio.

There were no significant differences among groups on examination scores. A retention test given 218 days later to 114 students of the original group also resulted in no significant differences among groups.

Five hundred and eighty-eight chemistry students were divided into two sections. Students in each section were again divided into large lecture rooms or small ITV classroom subsections.

Analyses of covariance, controlling on Test of Developed Abilities in Science scores, indicated no significant differences between achievement test scores for face-to-face or ITV students of either section.

One hundred and eighty-nine students in business law were divided into four groups: (1) ITV only, (2) originating lecture room only, (3) ITV for two weeks and then originating room for two weeks, and (4) originating room for two weeks and then ITV.

Analysis of variance indicated no significant differences among groups in achievement test scores.

Two hundred and seventy-nine students in introductory sociology were divided into ITV and originating lecture room groups. Examination scores were analyzed for questions covering the textbook and for questions covering the lecture.

Analyses of variance indicated no significant differences between face-to-face and ITV groups for either type of examination questions.

One hundred and ten students in meteorology were divided into ITV and face-to-face groups. All students took four examinations. Pearson r's (odd-even items) adjusted by the Spearman-Brown formula for two of the examinations were .80 and .73.

Analyses of covariance, controlling on partial SCAT scores, and _t_-tests indicated no significant differences between scores of face-to-face and ITV students on any of the four examinations.

One hundred and eighty-eight students in psychology were divided into ITV and directly instructed groups. _No textbook was used_, and visuals were projected to the face-to-face group whenever a similar visual appeared in the ITV lecture. The same teachers taught both groups. Care was taken in constructing the examinations that they measured complex (principles) as well as factual learning.

Over four examinations there were no significant differences between direct instruction and ITV groups.

Ninety students in music appreciation were divided into face-to-face and ITV groups. All students took an information and a music appreciation pretest. Two examinations were given during the course, each having a factual and a listening section. The first factual test had an odd-even r of .74 (Spearman-Brown).

Analyses of variance and _t_-tests indicated no significant differences of scores between direct and ITV instruction on the first or second listening or factual tests.

Distance

Studies showed no significant differences in examination scores for directly instructed students near or far from the instructor in chemistry, or closer or farther than twelve screen widths in psychology.

Class Size

Generally analyses of covariance indicated no significant differences in test scores of ITV students in small or large ITV classes. Class sizes varied from 11 to 119.

Sex

Students in a psychology of marriage class were divided into female, male, and mixed-sex classes.

Analyses of covariance controlling on pretest scores indicated no significant differences on examination scores for any of the three groups. Students preferred mixed-sex classes.

Magnification

Students in an education class were divided into direct lecture with TV to enlarge the visuals, and ITV only presentation groups.

t-tests indicated no significant differences on two test scores between the two groups.

Proctors and Attendance

Students in psychology of marriage were divided into a no proctor, proctor but optional attendance, and proctor and required attendance. Absences were about the same in all three groups.

Air science students were divided into three groups: having a commissioned AFROTC staff officer, having a cadet officer, and having a member of the class chosen at random as proctor. After three weeks all students took an achievement test having two forms (K-R #20 r's = .79 and .81).

There were no significant differences in achievement scores among groups, and no significant differences in students' preferences for the proctoring system.

ITV and Face-to-face Follow-up

Five hundred and fifty students in psychology were divided into ITV (35 minutes) plus a graduate student led discussion (15 minutes), viewing ITV plus viewing the teacher discuss with instudio students, or no discussion (35-minute ITV portion only).

Analyses of variance indicated no significant differences on achievement scores among the three groups. Students preferred the face-to-face discussion treatment.

Talk-back

Two hundred and sixty economics students were divided into talk-back and listening to talk-back ITV sections.

t-tests indicated no significant differences on achievement test scores between the two groups.

Students exchanged treatments halfway through the semester. An attitude survey at the end of the semester indicated students tended to like a talk-back system, said the talk-back system did not affect their achievement, thought it should be retained, and indicated they themselves almost never used it.

A similar experiment with 120 air science students using a 60-item objective test (K-R #20 r = .74) also resulted in no significant differences in students' achievement scores between talk-back and listening only ITV groups.

Independent Study and Discussion

The 120 students in the upper 40 per cent of an economics class were divided into two groups. Both groups had two ITV lectures each week; one group attended a problem-solving discussion section each week, and the other group worked the problems independently. After four weeks, students took an examination having a multiple-choice and a problem-solving section.

t-tests indicated no significant differences in students' scores on the multiple-choice section, but that on the problem-solving section, scores of students in the problem-solving discussion group were significantly higher than scores of students in the independent study group.

Eighty-four volunteer meteorology students were randomly assigned to required attendance vs. required independent study groups for four weeks.

Analyses of covariance controlling on scores on the first examination indicated no significant differences on examination scores for either of the two groups, either in the face-to-face or ITV section.

Corrected Workbooks

Over 200 psychology students were divided into three groups: having no workbooks, having workbooks and being encouraged to fill them out, and having workbooks turned in and corrected weekly.

Analysis of covariance controlling on scores of the first examination indicated no significant differences on examination scores among groups. Analysis of variance, run on a special ten-item test specifically testing problems covered in the workbooks, indicated that the workbook groups had significantly higher scores than the non-workbook group, and the group having workbooks corrected weekly generally had higher scores on this specific test than the students who didn't have their workbooks corrected. Students were generally favorable toward the workbook.

Visualized ITV Presentation

Seven hundred and ten air science students were divided into two groups: ITV presentation by an instructor having a blackboard, and ITV presentation by an instruction team having several visuals, dramatizations, etc.

Analysis of covariance controlling on the previous examination scores indicated that students in the lecture-blackboard groups had significantly greater scores than students in the other group. The difference between scores of the two groups was .9 points. A similar experiment with 191 psychology students produced no significant differences.

Behavioral Choice

Six hundred and twenty-six chemistry students in two sections were involved in a behavioral attitude experiment in 1955-56. Students in both sections were divided into lecture-demonstration or ITV classroom groups. In addition, lecture students were divided into front, middle, or rear portions of the lecture hall. As was true of all the other experiments, all assignments were random. After four weeks, following the first achievement test, students switched treatments. After eight weeks and another achievement test, both groups received chemistry in the lecture hall. After another week and a half students were given the option of remaining in their present lecture seats or moving to the ITV classrooms.

Thirty-two per cent moved to the ITV classrooms. In one section, 52 per cent of those seated in the back, 31 per cent of those in the middle, and 13 per cent of those in the front of the lecture hall moved to the ITV classrooms. In the other section the percentages were 46 per cent, 33 per cent, and 16 per cent respectively. Those staying in the lecture room mentioned lack of color and narrow field of view of television as reasons for staying. Those moving to ITV rooms mentioned the close-up views of ITV, more comfortable rooms, and lack of distraction as reasons for moving to the TV rooms.

One hundred and forty-four business law students were divided into two groups: face-to-face and ITV presentation. After the mid-semester examination (eight weeks), all students returned to the face-to-face situation. Fifty-four per cent then preferred face-to-face and 42 per cent preferred ITV presentation. A week later, students were given the choice of returning to ITV or remaining in the face-to-face lecture section. Fifty-three per cent chose the direct instruction and 47 per cent chose the ITV presentation.

The correlation between covert and overt attitudes was .46. There was no significant relationship between the score on the final examination and behavioral choice, or score on the second examination and behavioral choice.

Two hundred and nineteen political science students were taught for several weeks by ITV, and were then all moved to a direct instructional situation. The students were then given the choice of ITV classroom or face-to-face presentation (this time with cameras in the classroom).

Fifty-one per cent indicated they preferred ITV and 46 per cent indicated they preferred face-to-face presentation. However, 70 per cent moved to the ITV classrooms and 27 per cent (3 per cent were absent) stayed in the face-to-face lecture room. The correlation between covert and overt attitudes was .33. Point biserial r between behavioral choice and pre-choice examination scores was .12, between behavioral choice and final examination scores was .15, and between behavioral choice and Inventory of Beliefs scores was .06.

6--C. R. Carpenter and L. P. Greenhill

Three hundred psychology students received a televised lecture-blackboard presentation and 300 psychology students received an ITV presentation with visual and graphics emphasis. After the ninth week, both sections were taught directly in a large lecture hall. After the twelfth week students took a vote.

Of the original visual-graphic ITV group, 61 per cent voted for ITV. Of the lecture-blackboard ITV group, 52 per cent chose ITV. The combined vote was 56 per cent in favor of returning to ITV. A significantly greater proportion of students who had been in small ITV rooms than large rooms preferred ITV instruction.

A similar experiment had 175 education students who had face-to-face presentation for four weeks and then ITV presentation for three weeks. A secret ballot taken then indicated that 61 per cent of the students favored continuing with ITV and 39 per cent favored returning to face-to-face presentation.

Attitude over Time

The researchers found from attitude surveys that from 1954-57 students' acceptance of ITV gradually increased. Within a course, students' opinions tended to become more definite. There were large course-to-course variations in attitude. Students seemed less concerned about ITV *per se* in 1957 than in 1954. Students noticed over time that ITV courses seemed to have better instructors who had better organized instruction and courses.

Carpenter, C. R., et al. The development of a sound motion picture proficiency test. Personnel Psychology, 7 (1954), 509-523.

Problem: comparative effectiveness of paper-pencil and sound motion picture tests of skill proficiency.

Sample: 316 draftees.

Subject taught: removal of power plant from a medium tank.

Key variables: learning ability, aptitude, multiple-choice problems, weekly practical grades, score on paper-pencil final examination, score on film multiple-choice examination.

This study investigated the possibility of using motion picture films as a medium for testing subjects' proficiency in skills. Subjects were selected from the Track Vehicle Repairman Course. (Average age was 21.9 years, S.D. = 2.2; Aptitude Area I score, ability to learn was 85.94, S.D. = 17.66; and Aptitude Area VIII score, ability to do repairs, was 91.33, S.D. = 17.63.) Subjects scored below average on aptitude tests.

Subjects were rated weekly by their instructors on five graphic scales: (1) quality of work, (2) application of classroom principles, (3) manual dexterity, (4) selection, use, and care of equipment, and (5) time spent completing work. These combined scales were used as the criterion for evaluating the work of the trainees. In addition to these scores, the work of the trainees was evaluated by a written examination administered at the end of the training period.

To test the comparative effectiveness of using motion picture film examinations instead of the two conventional verbal examinations, a film test showing in motion pictures with accompanying sound track selected operation in the removal of a tank power plant was produced. This film showed instructors in the school performing various tasks concerned with the power plant removal. All persons seen in the film were identified with large numerals on their chests and backs and small numerals on their shirt cuffs. Four versions of a particular skill were shown on the screen with an accompanying sound track. An off camera narrator read a question concerning the four choices and the students were asked to choose the correct versions they had seen and heard. The four versions were repeated. Ten seconds of clear film followed the repeats. The light from the clear film provided enough illumination for student to write down the correct version.

Two versions of the film test were constructed and a correlation of .92 was found. From the two versions, a final version of the film test was produced. It correlated .73 with the criterion (the combined weekly ratings) and .68 with the final written examination in the training course. The difference in the correlations was not statistically significant.

The authors observed that the criterion was probably not adequate because it was a verbal measure of performance when a behavioral measure was needed. They hypothesized that a high correlation would have been found with a behavioral type of criterion.

Conclusions: (1) motion picture tests yielded high reliability, (2) there was little difference between paper-pencil tests and film tests of this particular skill, (3) film tests are practical to administer, objectively scored, and make possible tests in areas of performance not amenable to paper-pencil tests, (4) there was no confirmation of the hypothesis that film tests would minimize the importance of verbal ability, and (5) situation-type tests with films indicated an ability to discriminate among students.

Carter, Lamore J., Roy B. Moss and Mamie T. Wilson. A comparative study of the effectiveness of three techniques of film utilization in teaching a selected group of educable mentally retarded children enrolled in public schools in Louisiana. [USOE Project Number not given.] Grambling: Grambling College of Louisiana [n.d.] (Mimeographed)

Problem: determine the relative effectiveness of various film presentations on educable mentally retarded children.

Sample: 60 pupils in 16 Louisiana schools.

Subject taught: health and safety.

Key variables: learning from narrated film, film with children's voices on the sound track, silent film and viewing children encouraged to verbalize their reactions; different levels of mental retardation.

Three kinds of seven 20-minute films on health and safety were made; visual elements were the same on all films.

All pupils were given the 1937 S-B and took a 40-item picture test, which required students to choose the best of four pictures illustrating specific health practices.

The 16 schools were then collected into four groups: a narration film group, children's voices film group, children encouraged to react overtly film group, and a control group. An alternate form of the picture test was then given as a posttest.

Although higher ability retardees did better than lower ability, there were no differences among treatments when subjects were divided into higher and lower ability groups.

Caspers, Wesley. An experimental evaluation of certain motion picture films in selected educational psychology classes in Kansas colleges. Unpublished Doctor's dissertation, University of Minnesota, Minneapolis, 1956.

Problem: evaluate the effectiveness of sound films for achievement in educational psychology courses and to determine attitudes toward them.

Sample: 216 students in educational psychology in six Kansas colleges.

Subject taught: educational psychology.

Key variables: number of sound films viewed; learning, and MTAI scores.

Sixteen films were selected to cover four areas of educational psychology: (1) growth and development, (2) individual differences, (3) group learning and (4) motivation and interest. Twelve classes from six Kansas colleges viewed seven of the sixteen films. Six other classes served as a control group. The twelve classes were divided into four groups, and each group received a different treatment in number and sequence of the films viewed. The number of films seen in each area differed: four films were presented in one area, three films in another, two in a third, and none in a fourth area. All subjects took an achievement test covering the content of the sixteen films before and after viewing the sequence. This test was subjected to item analysis and was validated by correlating test scores with scores on the final objective test in the course.

An analysis of variance and covariance was run to determine the effect of treatments. Scores on the film series content test in each of the four areas were significantly related to the number of films shown in that subject area (up to the maximum of four films). Attitudes (as measured by the MTAI) improved significantly during the semester for all classes.

Castle, C. Hilmon. Open-circuit Television in Postgraduate Medical Education. Journal of Medical Education, 38 (1963), 254-260.

Problem: effectiveness of TV in reaching physicians for postgraduate education.

Sample: open-circuit TV audience of 209 physicians per program; experimental comparison of retention with 23 physicians and 33 medical students.

Subject taught: Diabetes Mellitus.

Key variables: number of viewers, both physicians and lay personnel, response of physicians, learning, TV teaching, retention of subject matter presented.

From February to April 1960, eight half-hour medical clinics on diabetes mellitus were telecast by the College of Education over open-circuit educational television station KUED in Salt Lake City. Approximately 85 per cent of the physicians in Utah are within the coverage area of the station. Nineteen per cent or 209 out of 1100 physicians and 68 per cent or 130 of 192 medical students registered for the series and received syllabi. From a mail questionnaire it was determined that 365 physicians or 55 per cent watched at least one of the eight clinics. The audience for each clinic was estimated at 209 physicians or 19 per cent. Ninety-four per cent of the responding physicians rated the clinics favorably. Three per cent rated the clinics unfavorably and 3 per cent did not respond. A majority of the physicians who did not view any of the clinics said they forgot or were engaged at the time of presentation. Three per cent said they would not be interested in future programs of this type. Seventy-five per cent of the viewers and 68 per cent of the non-viewers had viewed other medical TV clinics within the last five months.

The author states that medical clinics can be used effectively to reach physicians when broadcast over open-circuit television stations. The lack of privacy for the physicians producing the program can be minimized by transmitting the programs at hours unusual for lay viewing, announcing the program only to physicians, interposing dead air periods between the station's preceding program's termination and the beginning of the medical clinic, and using educational instead of commercial TV channels. (There was an unsuccessful attempt to estimate the size of the lay audience for the clinics.)

Recall of information from the series was tested by administering a 50-item multiple-choice content test to a volunteer group in a pretest posttest design. The test group was composed of 23 physicians and 33 medical students, who viewed an average of six of the eight programs.

2--Castle, C. Hilmon

Five of the physicians and two of the students failed to view at least two of the clinics and were dropped from the study. Of the remaining group, 18 physicians and 31 medical students were tested. A perfect score on the test was 100 per cent. The subjects scored as follows:

Subjects	Pretest Average	Posttest Average
Physicians	70%	88%
Medical students	64	85

Conclusions. The author concludes that (1) Open-circuit television can be used in postgraduate medical education without undesirable effects; (2) the advantages of this application are extensive coverage, simplicity, availability, and relatively low cost; (3) lack of privacy and the passive role of the learners can be minimized.

(This study also includes a review of the history of open-circuit television uses in postgraduate medical education and a description of the production of the clinics.)

Chabe, Alexander M. An experiment with closed circuit television in teacher education. *Peabody Journal of Education*, 40 (1962), 24-30.

Problem: effectiveness of televising classroom (face-to-face) instruction to student teachers.

Sample: 20 college students.

Subject taught: teacher education.

Key variables: observing by TV, observing in classroom, skill in social studies instruction.

This study was concerned with the effectiveness of observing instruction by closed-circuit TV. In previous work student teachers learned the objectives of social studies instruction which were (1) understandings, (2) skills, attitudes, and appreciations. The observations of an actual Grade 5 classroom during social studies instruction was to demonstrate how these objectives were being met.

In consultation with a social studies methods professor, the fifth-grade campus schoolteacher agreed to prepare a lesson guide to be used by two groups of observers. One group of observers provided with the lesson guide (control group) (n = 4) sat in the classroom during the instruction period. The other group observed the class by TV (experimental group) (n = 16). The experimental group was separated into two sub-groups. One used the lesson guide prepared by the classroom teacher and the other sub-group did not use the guide.

All observers were to record the manner in which the classroom situation they observed met the objectives of social studies instruction. In analyzing these reports the author concludes that (1) TV observation was almost as effective as guided classroom observation, (2) TV viewers with lesson guides were twice as effective as those without the guides, (3) TV observation allowed student teachers to observe the same situation as the classroom observers.

Champa, V. Anthony. Television: Its effectiveness in ninth-grade science teaching. Audio-Visual Communication Review, 6 (1958), 200-203.

Problem: determine the effectiveness in learning from face-to-face, ITV, and film presentations.

Sample: 300 pupils from two junior high schools in Lancaster, Pennsylvania.

Subject taught: ninth-grade science.

Key variables: face-to-face, television, and film presentations, learning, attitudes.

Pupils were divided into three groups. One group was taught by face-to-face instruction with neither ITV nor films. The second group saw two 15-minute ITV programs each week during their regular class time. The third group saw two 15-minute films each week during their regular class time. Outside of the TV and film portions, the study program of the three groups was the same. Often the same films shown on the TV program were used in the film group. Teachers taught one section in each of the three groups. Students were given the Cooperative General Science Test, retention tests, and attitude toward science tests for pre- and posttests. A mental age measure and ages were also available.

Analysis of variance indicated no significant differences in achievement scores among the three groups, although the boys in each group had higher scores than the girls in that group.

Pupils were quite favorable to using ITV and films.

A greater proportion of all pupils in the experiment continued their study of science a year after the experiment than the previous year's students.

Clevenger, Theodore, Jr. and Martin T. Cobin. An experiment in open circuit television instruction in the basic course in oral interpretation. Speech Monographs, 26 (1959), 149-154.

Problem: comparative effectiveness of TV and face-to-face instruction.

Sample: 115 college students (University of Illinois).

Subject taught: oral interpretation.

Key variables: TV teaching, face-to-face teaching, achievement test, evaluation of reading ability of prose and poetry.

Three sections of the basic course in oral interpretation were taught by open-circuit TV. Four sections of the same course were taught by face-to-face instruction. Graduate student assistants supervised classroom meetings while one professor taught the TV sections, and two professors taught the face-to-face sections. Television sections rotated between the TV studio where they served as a participating class and the receiving classrooms.

Achievement was measured by scores on a common general content test of 74 true-false items which had been pretested and determined to be representative of the material that should have been covered in the course. This test was administered to all sections as a pretest at the beginning of the semester and as a posttest at the end of the semester. Reading ability was determined by jury evaluation of tape recordings made by each student at the beginning and end of the semester. Points were assigned to each reading and the judges did not know whether they were hearing a pretest or a posttest. Scores were obtained by summing the ratings and subtracting posttest from pretest.

Results. There was no significant difference between the TV taught and face-to-face taught sections for poetry and prose reading improvement ratings. There was no significant difference between the TV and face-to-face taught sections in content gains from pretest to posttest.

Conclusion. It is possible to conduct a course in oral interpretation via open-circuit TV using graduate assistant instructors which is equally effective to face-to-face teaching by experienced faculty members.

Also see:

Cobin, Martin T. and Theodore Clevenger, Jr. Television Instruction, Course Content, and Teaching Experience Level: An Experimental Study in the Basic Course in Oral Interpretation. Speech Monographs, 28 (1961), 16-20.

Cobin, Martin T. and Theodore Clevenger, Jr. Television instruction, course content, and teaching experience level: an experimental study in the basic source in oral interpretation. Speech Monographs, 28 (1961), 16-20.

Problem: comparative effectiveness of TV and face-to-face instruction with variation in experience of classroom instructors.

Sample: 287 students at University of Illinois.

Subject taught: oral interpretation.

Key variables: TV teaching, face-to-face teaching, experience of instructors, scores on final examination.

Sections of the beginning course in oral interpretation, three taught by an experienced faculty member using open-circuit TV for lectures with supplementation in the classroom by graduate assistant instructors having no prior teaching experience, and eleven taught face-to-face by graduate assistant instructors with varying levels of prior teaching experience, were compared for retention of specific course content at the end of a semester's instruction.

Comparison was based on scores of 100-item objective final examination. The 11 control sections were divided into four groups: (a) three sections taught by graduate assistants who also taught supplementary sessions for the TV lectures, (b) two sections taught by graduate assistants with little prior experience, (c) three sections taught by graduate assistants with considerable prior graduate assistant level teaching experience, and (d) three sections taught by graduate students with full-time teaching experience.

Results. (1) Median score for TV-taught group was significantly higher than median of group taught face-to-face by least experienced instructors. (2) Median score of TV group was higher, but not significantly, than the median of group taught face-to-face by inexperienced instructors who also served as supplemental instructors of TV classes. (3) Median score of TV classes was significantly higher than the median score of the combined classes taught face-to-face by the inexperienced and moderately experienced graduate assistant instructors. (4) Median score of TV group was higher, but not significantly higher, than median score of all face-to-face taught groups.

Conclusions. Prior teaching experience does affect effectiveness in teaching subject matter with a direct relationship between the two. An experienced full-time teacher can combine TV with inexperienced graduate assistant supervision into a course which is more effective, for subject matter, than a course taught face-to-face by inexperienced graduate student assistant instructors.

Also see:

Clevenger, Theodore, Jr. and Martin T. Cobin. An Experiment in Open Circuit Television Instruction in the Basic Course in Oral Interpretation. Speech Monographs, 26 (1959), 149-154.

Cobin, Martin T. and Charles J. McIntyre. The development and application of a new method to test the relative effectiveness of specific visual production techniques for instructional television. USOE Project Number 448. Urbana: University of Illinois, September, 1961.

Problem: to develop a method to evaluate the effectiveness of specific production techniques.

Sample: 310 speech students at the University of Illinois.

Key variables: form of the visual, camera number, video dimension, note-taking, and eye contact.

A television system was arranged so that the output of one camera could go to one classroom while the output of another could go to another classroom, or that a classroom could receive both outputs, or that all classrooms could receive the same output.

Students took short tests of learning and attitudes. These were analyzed by analysis of variance, _t_-tests, and chi square.

Students' responses differed when they were taking notes or not taking notes, and students preferred simple production techniques, such as continuing closeups, rather than a variety of shots.

Coleman, Wade H. Jr., Eugene Dutton, and Jonathan C. Bookout. Learning Aural-oral Spanish Skills by Television. University: University of Alabama, December, 1960.

Problem: determine the relative development of aural-oral Spanish skills in ITV and face-to-face students.

Sample: 72 high school and college students.

Subject taught: Spanish.

Key variables: qualified and non-qualified teachers, race, achievement; ITV and face-to-face instruction.

Students were randomly selected from schools having qualified or non-qualified Spanish teachers, and who were receiving Spanish chiefly by ITV or by face-to-face instruction. Students were interviewed. Evaluators listening to the taped interviews rated each student on (1) pronunciation, and (2) comprehension, vocabulary, and grammar. Interrater correlations for pronunciation test scores ranged from .67 to .76, and interrater correlations for comprehension, vocabulary, and grammar test scores ranged from .53 to .71. No written work was included.

The ITV group having qualified teachers performed significantly better than the ITV group with non-qualified teachers, and better than the face-to-face group with qualified teachers (.05 level). There were no significant differences between the ITV group without qualified teachers and the face-to-face groups.

Commonwealth Office of Education. The effective use of sound films. Research Report No. 4. Sydney, Australia: The Office of Education, May, 1950. Audio-Visual Communication Review, 2 (1954), 78-79. (Abstract)

Problem: determine the effectiveness of various ways of presenting a film.

Sample: boys in six junior technical schools in Sydney.

Key variables: (1) 10-minute introduction, film, and then a test; (2) introduction, film, 10-minute discussion, and test; (3) introduction, film, film again immediately, and test; (4) introduction, film, discussion, film again after 24 hours, test; (5) introduction, film, class told a discussion would be held the next day, discussion the next day, film again, test; (6) introduction, film, discussion, and 24 hours later the film again, discussion, and test; learning, retention, and ability level.

All classes took 20-item pretests a month before the first film, and a retention test 18-21 days after the last film. One investigator conducted all discussions. There were six films; all classes received all six treatments using one different film for each treatment.

The most effective method was (4). Its effectiveness was not due merely to the greater time it took. Methods (5) and (6) were about equal, and were more effective than (1) through (3). Method (1) was least effective.

Bright boys learned more than dull boys. Boys who attended entertainment films more frequently learned more.

Craig, Gordon Q. A Comparison between sound and silent films in teaching. British Journal of Educational Psychology, 26 (1956), 202-206.

Problem: comparative effectiveness of sound and silent instructional films.

Sample: 260 students ages 9 through 15.

Subject taught: see below.

Key variables: learning, sound films, silent films.

Two groups of students, matched on Common Entrance Examination scores, were taught six subjects by seeing six films. One group of 124 students saw the films, heard their sound tracks, and was given tests over film contents. The other group of 136 students, saw the same films, took the same tests, but did not hear the sound tracks but rather heard a commentary about the film ad libbed by their teacher. The films were: (1) Making Glass for Houses, (2) A Rock Pool for Schools, (3) Light - First Principles, (4) Common Cross Spider, (5) How Television Works, and (6) Ants. One month after viewing the films, the students were given the same tests to measure retention.

Results. Scores and standard deviations for the students and the methods of instruction were:

TEST	SILENT FILM			SOUND FILM		
	n	mean	Standard Dev.	n	mean	Standard Dev.
posttest	752	15.86	3.11	746	12.76	3.44
delayed posttest	706	13.19	3.28	691	11.92	3.33

Conclusions. The silent version was found to be superior to the sound version of the films. The author felt this was due to ability of face-to-face teacher to relate film content to class activities and to adapt the film to immediate purposes in the classroom.

Curry, Robert P. Report of three experiments in the use of television in instruction. Cincinnati: Cincinnati Public Schools, July, 1959. (Offset)

Problem: determine the relative effectiveness of face-to-face and ITV presentations on learning, and to determine pupils' and teachers' attitudes toward ITV.

Sample: 744 mathematics pupils and 818 science pupils.

Subjects taught: biology, seventh-grade mathematics, and sixth-grade science.

Key variables: learning and attitudes; face-to-face and ITV presentation.

ACHIEVEMENT

Seventh-grade mathematics: Three classes were chosen from each of nine Cincinnati schools. One class viewed 20-minute ITV mathematics lessons daily and had some face-to-face mathematics instruction; another class, taught by the same teacher, had face-to-face mathematics instruction exclusively, and a third class, taught by a different teacher, also had face-to-face instruction only. The three schools having the highest mean student IQ, the three schools with the middle mean student IQ, and the three schools with the lowest mean student IQ were termed the above average, average, and below average ability schools respectively. IQ scores were from the Lorge-Thorndike. The STEP Mathematics level 3A test served as the final criterion measure of achievement.

Adjusted means of above average and average ability pupils in either control group were significantly higher than above average and average pupils in the experimental (ITV) group (.05 level). There were no significant differences between adjusted means among any of the groups for below average pupils or between either of the control groups for any ability level.

It was concluded that the level of ITV instruction was not directed toward the above average ability pupil. (1)

Sixth-Grade Science: Two sixth-grade classes from each of 15 schools were selected. Five schools were termed above average, five average and five below average, on the basis of mean student IQ. Within each school, classes were randomly assigned to ITV and face-to-face treatments. Within each school, the same teacher taught both classes. Lorge-Thorndike scores served as the basis for adjusting final criterion scores, and the STEP Science test level 4A served as the final achievement measure. The ITV lessons were 30 minutes long and were shown every other school day.

Adjusted means of average and below average pupils in the ITV groups were significantly lower than were means of similar ability pupils in face-to-face groups (.05 level). There were no significant differences between adjusted means of pupils of above average ability in ITV or face-to-face groups. (2)

ATTITUDE

Teachers' responses to a 19-item questionnaire (a hypothetical conversation in which subjects agreed or disagreed with the remarks) indicated that they felt ITV could be equally effective as face-to-face instruction, although they were not sure whether they would want to have another ITV television class, or whether they received the same satisfaction from teaching a class that was receiving ITV programs. Nevertheless, they did not feel that ITV would threaten their jobs. They tended to feel that students learned as much by ITV as by face-to-face methods, and that the quality of ITV was high.

Pupils' responses to a similar 16-item questionnaire indicated that sixth-grade pupils preferred ITV most, seventh-grade pupils next most, and ninth-grade biology pupils least most. This trend could be due to the class or to age level. Below average ability pupils preferred ITV most, average next most, and high-ability pupils least. Pupils were disappointed at not being able to ask questions, but seemed to prefer the uninterrupted characteristic of the ITV lesson. (3)

References

(1) Abstract of James N. Jacobs and Joan K. Bollenbacher, Biology. (See Audio-Visual Communication Review, 8 (1960), 176-191.)

(2) Jacobs, James N. and Grate, John. "Teaching Sixth-Grade Science by Television," Elementary School Journal, November, 1962, Vol. 63, No. 2.

(3) Jacobs, James N. and Bollenbacher, Joan. "Teacher and Pupil Opinions of Instructional Television," The NASSP Bulletin, March, 1960.

Curry, Robert P. Report of four experiments in the use of television in instruction. Cincinnati: Cincinnati Public Schools, September 1, 1960. (Offset)

Problem: determine the relative effectiveness of face-to-face and ITV presentation and assess students' attitudes toward ITV.

Sample: 660 fifth-grade science pupils, 263 mathematics pupils, and 251 biology pupils.

Subjects taught: fifth-grade science, seventh-grade mathematics, and biology.

Key variables: learning, ability, involvement, retention, and attitudes; face-to-face and ITV presentation.

Fifth-grade science: One class in each of 15 schools had 20-minute ITV science lessons every other day plus ten minutes of classroom discussion and follow-up. The other class in each school had face-to-face instruction. Both classes in each school were taught by the same teacher. Five schools were selected at each of three arbitrarily defined ability levels. Kuhlman-Anderson intelligence scores defined ability levels; the criterion measure was the STEP science form 4B.

Analysis of covariance indicated that below average and average ITV pupils had significantly lower STEP scores (.01 level) than did face-to-face pupils of comparable ability. There were no significant differences between scores of above average ITV and face-to-face pupils. (1)

Fifth-grade science (pupil involvement): One fifth-grade class in each of 15 schools was randomly assigned to receive ITV under conditions of high-pupil involvement, while one class in 15 other schools received ITV under conditions of low-pupil involvement. All pupils had received four months of fifth-grade science every other day. No teacher-initiated discussion or follow-up occurred after the telecasts during the experiment.

After four weeks, pupils took a 45-minute multiple-choice test. Pupils took a 5-item attitude questionnaire before and after the experiment.

Analysis of covariance indicated no significant differences between high- and low-involvement groups for above average, average, or below average ability levels.

There were no significant differences between low- and high-involvement groups on listing their favorite subjects, or whether the ITV lessons were paced right. The pre-questionnaire and low-involvement group responses were not significantly different in liking to study science by ITV, but the pre-questionnaire and high-involvement group responses were significantly more unfavorable toward ITV. Pre-experimental and low-involvement groups found it easy to pay attention to ITV lessons, but pre-experimental and high-involvement groups found it harder to pay attention. These two differences were primarily due to high-ability students. Similar results were found for liking to take science by ITV next year; pre-experimental and low-involvement groups indicated they would like it whereas pre-experimental and high-involvement groups indicated they would not like it. (2)

Grade seven mathematics: The purpose of this particular experiment was to compare the effectiveness of ITV and face-to-face instruction with homogeneously grouped, low-ability pupils. The course was designed for pupils who were 1 1/2 to 2 1/2 years retarded in arithmetic achievement. Pupils were selected for the course by their grade on the Stanford Intermediate Arithmetic Achievement Test. Principals of three schools randomly assigned pupils in their schools to four sections, two of which received face-to-face instruction and two of which received ITV lessons. Each teacher taught a television and a face-to-face class. Telecasts were shown three days a week for 20 minutes, and were followed by 30 minutes of class discussion. Seven months later, all pupils took the Metropolitan Intermediate Arithmetic Achievement Test.

There were no significant differences on computation subtest scores on the Metropolitan exam between ITV and face-to-face pupils. For the problem-solving and concepts subtests scores a significant interaction was found between methods and teachers. t-tests indicated that scores of ITV pupils were significantly higher (.05 level) than scores of face-to-face pupils in two of five comparisons. (3)

Biology: A follow-up retention study was made of an earlier experiment. 180 pupils had received biology by ITV and 180 had received biology by face-to-face instruction. The ITV classes had been 50 minutes long. Some pupils had taken additional science courses since then and some had not. Pupils were given an alternate form of the Cooperative Biology test that they had taken two years earlier.

Analysis of covariance indicated no significant differences in retention scores between ITV or face-to-face pupils, for any of three levels of science courses taken since biology. When above average ability classes alone were considered, and posttest scores were adjusted for pretest scores, posttest scores of ITV classes were significantly higher than scores of face-to-face pupils (.05 level). However, for the same group, when retention test scores were adjusted for either pretest or posttest scores, there were no significant differences between ITV or face-to-face pupils.

3--Robert P. Curry

References

(1) Jacobs, James N.; Grate, John H.; Downing, Ullainee M. "Do Methods Make a Difference in Educational Television?" *The Elementary School Journal*, February, 1963, Vol. 63, No. 5, pp. 248-54.

(2) Jacobs, James N.; Bollenbacher, Joan; Keiffer, Mildred. "Teaching Seventh-Grade Mathematics by Television to Homogeneously Grouped Below-Average Pupils," *The Mathematic Teacher*, November, 1961, Vol. LIV, No. 7, pp. 551-55.

(3) Jacobs, James N.; Bollenbacher, Joan. "Retention of Subject Matter in Televised Biology." *Audio-Visual Communication Review*, November-December, 1960, Vol. 8, No. 6, pp. 275-80.

Curry, Robert P. Five years of research in television instruction in the Cincinnati public schools, 1955-56 through 1959-60: summary and generalizations. Cincinnati: Cincinnati Public Schools, September, 1960. (Offset) (See other abstracts of the same author. This summarizes some experiments in the other abstracts and briefly outlines a few earlier experiments, such as televising a driver's education course and a 12th grade chemistry course.)

Davies, Vernon; Edward Gross and James F. Short, Jr. Experiments in teaching effectiveness applied to introductory sociology. [Pullman:] Washington State University, August 1, 1958. (Offset)

Problem: determine students' achievement and attitudes toward the teacher and course.

Sample: 60 students.

Subject taught: Introductory Sociology.

Key variables: lecture, lecture with visual aids, ITV; attitudes, achievement, and teacher.

Students were assigned to one of three groups. Each group received a four-week presentation by lecture, lecture with visual aids, and ITV. Three teachers were also rotated among the three groups.

Analyses of covariance on achievement socres indicated no significant differences among the three methods of instruction.

For teacher A, 25 out of a possible 111 comparisons of students' reactions to the three teaching methods were significant (.05 level), of which 23 favored the lecture method over the lecture with visual aids and over ITV. There tended to be no significant differences between students' attitude scores toward visual aids and toward ITV.

Students' scores on 15 of the 37 items on the objective attitude instrument rated instructor B significantly higher (.05 level) on his ITV teaching than on his lecturing with visual aids. On two items he was rated significantly higher on his ITV teaching than on his lecturing. On 12 items he was rated higher on his lecturing than on his lecturing with visual aids.

Students' scores on 16 items for instructor C rated him significantly more favorable on his visual aids presentation, on 4 items rated him significantly more favorable on his ITV presentation, and on two items rated him significantly more favorable on his lecturing.

De Prospo, Nicholas D. Developing scientific attitudes by responding actively to motion pictures: a study to determine if responsing actively to selected motion pictures by identifying the problem-solving skills they portray reinforces or develops a scientific attitude in college freshmen. Unpublished Doctor's dissertation, New York University, New York, 1957.

Problem: determine if responding actively to motion pictures develops a scientific attitude.

Sample: 240 college students.

Subjects taught: Madame Curie, Yellow Jack, and the Scientific Method.

Key variables: motivated film group, film group, non-film group; attitudes, and attitudes over time.

Students were randomly assigned to one of the three groups, motivated film, film, or control. Students in the motivated film group understood the purpose of the experiment, identified the problem-solving skills as they were portrayed, and answered specific questions after viewing the films. All groups took a Thurstone-type scale of suspended judgment (r = .88) before and after the treatment, and again six weeks later.

Differences in attitude scores of the motivated film and film group were not significant; both groups had greater attitude change than the control group. Attitude change was not related to scholastic ability, or to ability to identify the skills, and was negatively correlated to the opinion of the scientists portrayed. The contribution of the films was not as great to retention as to the gain in attitude.

Devault, M. Vere, W. Robert Houston and Claude C. Boyd. Television and consultant services as methods of inservice education for elementary schoolteachers of mathematics. USOE Project Number 419. Austin: The University of Texas, 1962. (Mimeographed)

Problem: determine the relative effectiveness of television, television plus classroom consultant services, face-to-face lecture-discussion, and face-to-face lecture-discussion plus classroom consultant services.

Sample: 87 elementary teachers of grades 4-6 of Dallas Independent School District.

Subject taught: teacher training of mathematics.

Key variables: television and face-to-face presentation; classroom consultant services; teacher and pupil achievement, teacher attitude.

Half of the teachers saw 24 half-hour weekly videotaped lessons on mathematics instruction, and half took twelve 90-minute lecture-discussions (also presented by the TV teacher). Half of the teachers comprising each *of these groups had consultant services (averaging five visits a teacher)* in addition to the television lesson or lecture-discussion. A special instrument was constructed to measure teachers' achievement on phases of mathematics stressed in the experiment. The STEP Mathematics Level 2 and another test measured application and teacher achievement in the program. Also teachers' reactions were obtained.

Application of t-tests to instrument scores indicated no significant differences between television and face-to-face lecture-discussion groups in changing teachers' attitudes toward the in-service program, or in changing teachers' understanding of mathematics and methods, or in changing mathematics achievement and interest of pupils. Consulting services resulted in significantly more favorable reactions from ITV teachers and in greater mathematics achievement of their pupils. A parallel finding was not found for consulting services for the face-to-face teachers.

DeViney, Robert Dawson. An evaluation of closed-circuit television observation for students taking certain courses in elementary education. Unpublished Doctor's dissertation, North Texas State University, Denton, 1962.

Problem: determine if differences in achievement and attitudes toward pupil-teacher relations were a function of television observations.

Sample: 719 students in an elementary education course.

Subject taught: elementary education observation.

Key variables: television presentation, learning, attitude.

Instruments used included two to measure achievement, one for problem solving, and the MTAI. All were administered as pre- and posttests. The same instructor taught both experimental and control groups.

No differences were found between mean difference scores on either of the content tests, on the scores of the problem-solving test, or on the mean difference scores on attitudes toward pupil-teacher relations. This was true for both fall and winter semesters. Attitude test scores did not differ significantly between students who had had no television observations and television students. Seventy per cent of the students indicated they would voluntarily register for another ITV course.

Devitt, Joseph J. Intellectual Stimulation of Gifted Pupils in Small Secondary Schools through Televised Instruction. USOE Project Number 032. Augusta, Maine: State Department of Education [n.d.].

Problem: determine the relative effectiveness of ITV courses to stimulate gifted children in grades 10-12 of rural schools.

Sample: 600 students in over 200 public and private schools who had an IQ score of 120 or higher and who had superior reading ability.

Subjects taught: mathematics, and science.

Key variables: learning, ITV-only presentations, monthly seminars, biweekly visits, and both seminars and visits.

Students in each mathematics and science course had 30-minute ITV lectures five days a week throughout the year. Students took the STEP in math and science, the SCAT, the Facts about Science test, and a Sizing Up Your School Subjects questionnaire, before and after each school year. Students also took a 36-item attitude questionnaire and a 39-item multiple-choice biographical aspiration inventory at the end of the year.

Students were divided into four groups. One group had ITV plus their school's resources. A second group had in addition monthly seminars. A third group had biweekly visits from teachers, and a fourth group had both seminars and visits.

Analysis of covariance indicated that Mathematics I students' scores on staff-constructed achievement tests tended to be highest in the seminar and visits groups, and lowest in the ITV-only group. Analysis of variance indicated that Mathematics II seminars and visits students' scores on the staff-constructed achievement tests tended to be about the same as ITV-only students' scores, but the other two groups had significantly higher scores.

There were no significant differences among students' scores in either of the two science classes. There were no significant differences among students' scores in any of the four classes on STEP math or science scores.

In only one class, Mathematics I, was there a significant F ratio among groups on Sizing Up Your School Subjects scores.

Students tended to be more favorable toward face-to-face than ITV courses, and more favorable toward mathematics than science courses.

Diamond, Robert Mach. The effect of closed circuit resource television upon achievement in the laboratory phase of a functional anatomy course: A comparative investigation of television as a magnification device during laboratory demonstrations. Unpublished Doctor's dissertation, New York University, New York, 1962.

Problem: compare the achievement of face-to-face laboratory and television demonstration methods.

Sample: 107 college students.

Subject taught: Functional Human Anatomy.

Key variables: face-to-face and television demonstrations; ability; learning.

An analysis of variance was run on the scores of the experimental and control groups on four achievement tests. It indicated no significant differences between groups initially.

Control and experimental groups were subdivided by ability levels. _t_-tests, used to test for significance of differences between common ability levels of the control and experimental groups, showed that low-ability students in the experimental group had significantly higher scores than low-ability students in the control group on one test.

Since no differences were found generally, it was concluded that television's main advantage for laboratory demonstration was in the saving of instructor time.

Dietmeier, Homer Justin. The effect of the integration of science teaching by television on the development of scientific reasoning in the fifth grade student. Unpublished Doctor's dissertation, Boston University, Boston, 1961. (Compare studies by Gerard T. Amirian, Mary Elizabeth Kraft and A. Cornelia Sheehan.)

Problem: determine the effect of certain variables on science reasoning.

Sample: 90 fifth-grade classes in thirty towns around Boston.

Subject taught: fifth-grade natural science.

Key variables: teacher training, study guide utilization, class participation, individual projects, student ability and television presentation; learning and reasoning.

All pupils took one nationally standardized test and three specially constructed instruments which the author describes as science reasoning instruments. On the first instrument the pupils had to indicate which of a group of five formed a group of four because of a characteristic the fifth did not have. On the second instrument the pupils had to analyze visual images to find common characteristics. On the third instrument the pupils had to solve problems by deductive and inductive reasoning from certain statements of fact. All instruments were administered before and after the television series. Of the ninety classes, eighteen served as a control group, twenty-four classes had teachers trained in the utilization of television, twenty-four had teachers trained in elementary science, and twenty-four of the class teachers had no special training. Half of the seventy-two classes comprising the experimental group used the television series to begin the unit each day and half used the series to end the unit each day. Half the teachers received study guides and half did not. Half of the classes worked on common class assignments, and half worked on individual projects.

Class mean differences between pre- and posttests rather than individual differences were used in analysis. Analysis of variance technique showed no significant differences in science reasoning scores among any of the groups. Gain scores on a scientific information test were significantly higher for the experimental group.

The author mentions that scores on the reasoning instruments may be related to maturation, and that some information may well have been lost by the practice of using mean scores rather than individual scores. Gains on the scientific information test were not accompanied by parallel gains on the reasoning instruments. The author suggests two explanations: that the teaching techniques used were more appropriate for teaching science information than for developing science reasoning ability, or that science reasoning is related to maturation.

Dowell, Ernest C. An experiment in training by television. Project 53-32. Training Analysis and Development, 3380th Technical Training Group, Keesler AFB, February, 1954. Audio-Visual Communication Review, 4 (1956), 249. (Abstract)

Problem: compare television and face-to-face methods.

Sample: 127 trainees.

Subject taught: electronics.

Key variables: face-to-face and ITV; learning.

Three lessons were prepared; the same instructors taught ITV and face-to-face groups.

It was concluded that the presentation methods were equally effective.

Dreher, Robert E. and Walcott H. Beatty. Instructional Television Research. Project Number One: An Experimental Study of College Instruction Using Broadcast Television. San Francisco: San Francisco State College, April, 1958.

Problem: determine the relative effectiveness of face-to-face and ITV presentation and students' and teachers' attitudes toward ITV.

Sample: about 35 students in each of the presentation method groups in each of the four courses.

Subjects taught: psychology, economics, basic communication, and creative arts.

Key variables: achievement, ability, personality, auding, attitudes; on- and off-campus ITV and face-to-face presentation.

All students took the Edwards PPS, the Auding Test, the ACE or the SCAT, a self-insight scale, Bills' IAV, and a sociometric test. The latter three were given again at the end of the course, along with a questionnaire. Grade-point averages were also available for all students. Students in the psychology course took a subject-matter test (split-half r corrected by Spearman-Brown = .85) before and after the course. Students in the economics class also took Hill's Economics Test before and after the course. English-course students took the Cooperative English Test (Reading Comprehension) before and after the course. Creative arts students took a specially constructed achievement test as a posttest (r = .81).

Students were in one of three sections. The face-to-face section had three hours a week with the same professor who taught the ITV course and who made normal classroom use of audio-visual materials. Students in this section had schedules which prohibited them from seeing ITV broadcasts. The ITV on-campus group viewed two 45-minute ITV classes a week and had biweekly two-hour discussion periods with a professor other than the ITV teacher. The ITV presentation made use of special visualization materials. The ITV off-campus group watched the same ITV classes and had biweekly two-hour discussion periods with the ITV professor.

Analyses of variance run on EPPS scores for each of the four courses for the three different presentation methods indicated no significant differences in EPPS profiles among any of the four courses.

Analyses of variance run on high school GPA, SCAT scores, age, Auding Test scores, self-insight test scores, and subject-matter test scores indicated no significant differences among any of the three presentation groups in the psychology course. Similar findings were found for students in economics, English, and creative arts. It was therefore concluded that the groups did not initially differ significantly on any of these measures or on EPPS scores.

Analysis of variance on posttest subject-matter scores for psychology, economics, and English students in the three presentation methods groups indicated no significant differences among presentation methods. Chi-square indicated no significant differences in the frequencies of grades assigned to each of the groups in each of the courses for any of the presentation methods. t-tests of total course examination scores between the presentation methods within each course indicated no significant differences between presentation methods, except that in creative arts, on-campus ITV students had higher total course examination scores than face-to-face students (.05 level).

Analysis of variance run on posttest self-insight scores among presentation methods for each of the courses indicated no significant differences. t-tests on self-insight gain scores for each presentation method for each course indicated that students in psychology, English and creative arts made significant self-insight gains (.01, .01 and .05 levels respectively), but economics students made no significant self-insight gains.

A chi square test was made of IAV scores that moved more than one SE_m toward or away from the mean (norm), for students in all four courses. In only one group (psychology face-to-face students) was the movement significant. Chi square tests were also run on differences in pretest scores and on differences in posttest scores above and below the IAV means for all presentation method groups for all courses. No significant values resulted.

The top and bottom 27 per cent (as determined by grade-point averages) of each psychology and economics group were selected, and t-tests were run among the presentation method groups in each course. Face-to-face psychology students in the upper 27 per cent (GPA) had significantly lower gain scores than either of the ITV groups. Similar, though non-significant, trends existed for students in the economics course. t-tests of subject-matter gain scores of students in the lower 27 per cent in psychology and economics indicated that these face-to-face psychology students had significantly lower gains than the on-campus ITV students (.05 level). t-tests generally indicated no significant differences among presentation methods for any of the four courses for students with either high or low grade-point averages. Students with high ACE or SCAT scores in the ITV groups tended to gain significantly more than those in face-to-face groups. Students with low ACE or SCAT scores tended to gain about the same regardless of presentation method. Auding ability and scores on the need-achievement scale of the EPPS were not related to presentation method.

Sociometric techniques indicated that students tended to know each other more in face-to-face classes than in ITV classes. Off-campus ITV students tended to be favorable toward ITV, and on-campus ITV students tended not to be favorable toward ITV. Generally, students in the on-campus ITV groups were most critical of their course, and face-to-face students were least critical.

Professors generally were less than enthusiastic toward ITV. They frequently mentioned the lack of student contact as a reason for this attitude. Teachers did not approve of discussion sections meeting only every two weeks.

Driscoll, John P. Can TV Improve College Teaching. NAEB Journal, 18 (March 1959), 16-20.

Problem: comparative effectiveness of visualized TV and face-to-face instruction.

Sample: 293 students.

Subject taught: Introduction to Education.

Key variables: TV teaching, face-to-face teaching, attitude change, experimental class size.

A control group of 146 students, composed of five separate classes, was taught by non-visualized face-to-face instruction. The experimental group with 147 students was divided at random into two viewing rooms seating 24 and 123 students. Because of a slight difference in grade-point average between groups, analysis of covariance was used to evaluate data.

The experimental groups were taught twice a week by illustrated lectures broadcast over closed-circuit TV with camera and receivers in the room occupied by instructor and students. Students in the large experimental group were able to watch both the instructor and the TV screens. The small experimental group was given the same material two days per week. Both experimental groups met together one additional day per week for viewing motion picture presentations.

All groups were given a pretest and posttest on material covered in the course. Actual learning was measured by the objective final examination. Attitude change was measured by a pretest and posttest administration of the Minnesota Teacher Attitude Inventory and by a forced preference scale measuring attitude toward teaching as a profession.

Results. There was no significant difference between groups on the final examination, but the TV-taught groups had a slightly higher score. There was no significant difference between groups on the course content test gains from pretest to posttest, but scores favored the face-to-face group. All groups learned significantly from the course presentations. A significant gain from pretest to posttest on the Minnesota Teacher Attitude Inventory was noted for the TV-taught group (.001 level), compared to the gain for the face-to-face taught group. There was no significant difference in test performance for the large and small TV-taught classes. Students favored film learning over televised chart learning because chart presentations obligated and encouraged note-taking which students felt was useful but tedious. Students favored the foundational concepts portion of the course over the administrative and organizational concepts portion.

Driscoll, John P. The Effects of Mental Retardation on Film Learning. USOE Project Number 365. Los Angeles: University of California, [n.d.]. See also article by author in Research Bulletin of the Audio-visual Association of California, 2 (1960).

Problem: determine the relative effectiveness of various types of films on learning of mentally retarded children.

Sample: 402 students in 21 junior (mean MA = 68) and senior (mean MA = 69) Los Angeles County schools.

Subjects taught: Help Wanted (28-minute black and white story film), Our Economy, and Government (8-minute animated color film).

Key variables: learning factual and complex material, oral and visual tests, ability, and attitudes; film length, color and black and white.

Students were tested orally before and after the Help Wanted and Our Economy films, and after the Government film. Most responses were scored as "understands," "partially understands," or "does not understand."

Chi-squares run on before and after responses to questions showed a significant increase in factual learning from the Help Wanted film and a significant increase in complex learning from the Our Economy film. Students learned significantly more upon repeated screenings of this film. A posttest on the Government film was given by showing pictures from the film. Chi-squares run on before and after responses to five attitude questions for the Help Wanted and Government films also showed significant (.001 level) shifts to greater favorability from pre- to posttest.

There was no significant correlation between intelligence scores (above or below 68) and learning scores on the Government film.

Driscoll, John P. The effects of mental retardation on film learning: a study to determine what type of instructional film experiences are meaningful to children with mental retardation regularly enrolled in public schools. Los Angeles: University of California, [n.d.] (Mimeographed)

Problem: determine the effect of mental retardation on learning from film.

Sample: 402 junior and senior high school students in classes for the retarded in Los Angeles.

Subjects taught: getting a job, economy, civics.

Key variables: story, expository and animation films; learning, film repetition.

Three films were prepared: a 28-minute story film about getting a job, a 7-minute expository film of economy, and a colored, animated 10-minute film about civics. Differences in pre- and posttest scores on the learning instruments for both the 28-minute story film and the 7-minute expository film were significant; students learned from these films. Scores of students who saw the same film twice were significantly greater than scores of those seeing the film only once.

It was concluded that story films can teach behavior and emotionally involve students with the film. Short films or color films were not required for retarded students provided they became emotionally involved. It was possible to teach with films 30 minutes long. Humor was not as significant as story-line to the retarded. Retarded students -- except those of quite low ability -- generalized readily from ideas presented by film.

Duke, Ben Calvin, Jr. An analysis of the learning effects of differential treatment upon above- and below-average college students enrolled in a closed-circuit television course. Unpublished Doctor's Dissertation, Pennsylvania State University, University Park, 1959.

Problem: Determine the relative effects on learning of homogeneous grouping, independent study, and advanced readings on above-average college students and the effects of homogeneous grouping on below-average students in an ITV course.

Sample: 321 students.

Subject taught: economics.

Key variables: homogeneous grouping, independent study, advanced readings, and high- and low-ability level.

All students watched 30-minute television lessons and had 20-minute discussion periods following. After the first course exam, students were divided into high- and low-grade groups. The upper 40 per cent (n = 128) were randomly assigned to one of four groups: continued viewing with the others of the class, assignment to a special viewing room (high-ability homogeneous group), assigned to a special viewing room and having additional advanced readings, and excused from class attendance. Students falling in the lower 20 per cent of the distribution on the first test (n = 64) were all randomly assigned to viewing rooms along with the middle-range students except for one special section (low-ability homogeneous group). Proctors were rotated every four weeks.

Analysis of covariance controlling on the first exam scores and using the sum of the scores on succeeding tests indicated no significant differences among the above- and below-average groups on all tests.

Dunham, Morton D. An experimental study of the effect of two discussion techniques on educational outcomes in a beginning educational psychology class taught by closed-circuit television. Unpublished Doctor's dissertation, Michigan State University, East Lansing, 1958.

Problem: determine whether the absence of maximum feedback would result in significant differences between television and face-to-face discussion techniques.

Sample: 167 undergraduates.

Subject taught: Educational Psychology.

Key variables: ability, preference for instruction method, sex, discussion technique, TV presentation, achievement, MTAI scores, and misconceptions about education scores.

Students were randomly assigned to television or non-television discussion sections. Each of the four variables (ability level, preference for instruction method, sex, discussion technique) was divided into two levels for both television and non-television groups. Achievement was measured by a pre- and posttest for content, and attitude toward teaching by the MTAI. Also a test of misconceptions about education and a course evaluation scale were used. All students, television and non-television, saw fifty-minute lectures televised before the discussion periods began.

No significant differences were found in achievement scores or misconceptions about education scores between the face-to-face or television discussion methods. In the face-to-face situations, students with a cognitive preference for instruction had significantly greater attitude change toward teaching (MTAI scores) than students with an affective preference for instruction. In the television groups, no significant differences were found between students of cognitive and affective preference for instruction, although the television situation was significantly less effective in attitude change than the face-to-face situation for students with a cognitive preference. Students in the face-to-face group produced significantly more favorable opinions of the course, and fewer criticisms of the course, than students in the television group.

Duval, D. P., et al. The effectiveness, acceptability, and feasibility of technical training courses recorded on sound motion pictures and slides plus tape. Technical Report NAVTRADEVCEN 364-1. Port Washington, New York, June, 1960. Audio-Visual Communication Review, 8 (1960), 312. (Abstract)

Problem: determine the effectiveness of film and slides plus tape with face-to-face instruction.

Sample: trainees.

Subjects taught: the constant runout control valve, and the mirror deck landing sight.

Key variables: film and slides, and face-to-face presentation; learning, and attitudes.

The first course was four half-hours long and the second was 21 half-hours long.

The recorded instructor, judged by trainees' course grades, was as effective as the face-to-face presentation.

Dyer-Bennet, John and William R. Fuller, Warren F. Seibert, and Merril E. Shanks. Teaching calculus by closed circuit television. American Mathematical Monthly, 63 (July, 1958), 430-39.

Problem: comparative effectiveness of face-to-face and televised instruction, attitudes of students toward televised instruction.

Sample: 194 college students.

Subject taught: calculus.

Key variables: learning change for students in ability-ranked groups. Pretest posttest attitude toward instructional TV survey.

Students taught in two groups. Control group was taught by face-to-face instruction for three periods per week with 90 students and a fourth meeting per week with about 23 students with graduate student assistant. Experimental group was taught by television with four sections of 25 students each for three hours a week. Fourth meeting each week was taught by graduate student assistant in a face-to-face situation. Two professorial members of the Department of Mathematics taught both sections with the face-to-face and TV teachers exchanging roles half way through the semester. There was no significant difference in the pretest scores of the experimental and control groups on the Purdue Mathematics Training Test.

Two types of criteria were used in the study. Student achievement was measured by six tests administered during the semester. Attitudes were measured by a 10-item questionnaire administered to all students before and after the semester's instruction.

RESULTS

From the population of the groups, 61 matched pairs of students were drawn. Each of the 61 experimental group students was matched on the basis of grade-point average with a student in the control group. Correlation between GPA and summed scores on the six achievement tests was .65 for the experimental group and .55 for the control group. Of the six tests, four had no significant difference between experimental groups and control groups, two significantly favored the control group (with levels of significance beyond .01 and .05 respectively).

Student response to the 10-item pretest and posttest attitude inventory showed (1) students in the experimental group (TV) did alter their feelings unfavorably toward TV as a means of instruction, but this was not a complete rejection. About 40 per cent of the students in both groups felt TV had a place in the instruction when the semester was over, 20 students in the control group (face-to-face) did not feel that the TV classroom was as "comfortable" as the TV students felt it was.

CONCLUSIONS

1. Student achievement was nearly the same for both groups. No significant difference when scores on tests were summed.

2. No evidence of differential learning for different ability groups.

3. TV students shifted toward unfavorable opinion of TV as means of instruction after experiment.

4. Final reactions of TV students, while more negative than pretest reactions, was not strong enough to preclude acceptance of TV as means of instruction.

Ellery, John B. A pilot study of the nature of aesthetic experiences associated with television and its place in education. Detroit: Wayne State University, January 15, 1959. (Mimeographed)

Problem: determine the effect of a speech on students of various levels, and the effects of various production techniques on learning and retention.

Sample: 90 Michigan junior high school students; eight high school classes of about 20-25 students each.

Subjects taught: a speech by President Eisenhower; five short speeches on (1) speech sounds, (2) phonetics, (3) semantics, (4) public address, and (5) social aspects of speech.

Key variables: ability level, learning, retention and production.

Experiment I

Ninety junior high school students were divided into above average (110-125), average (95-105), and below average (below 95) IQ groups. IQ scores were from the CAT. Each group viewed a 30-minute kinescope of a speech by President Eisenhower and recorded their approval responses by pushing a button. Thirty-one days later students took a written posttest of twenty questions. Because the below-average group became disorderly after 15 minutes of the speech, responses of all groups were subsequently limited to that time in analysis.

On the retention instrument, above-average students did better than average, who in turn did better than below-average students.

Experiment II

Two kinescopes of five eight-minute segments each were produced; each pair of segments was identical except for one production variable. The production variables were dollying vs. cutting, production errors vs. no production errors, a limbo set vs. a non-limbo set, and flat lighting vs. key lighting. All high school students took a pre-, post-, and delayed (one month) subject-matter posttest.

t-tests on subject-matter scores generally indicated no significant differences between the production variables for any of the three test administrations.

Enders, Donald Earl. Academic achievement in grade six science resulting from supplementary instruction by open circuit television. Unpublished Doctor's Dissertation, Pennsylvania State University, University Park, Pennsylvania, 1960.

Problem: determine the achievement resulting from using supplementary television programs.

Sample: sixth-grade Pennsylvania children.

Subject taught: science

Key variables: television and face-to-face presentation; number of television lessons; learning.

One section received a weekly 15-minute science television program for 20 weeks, related to the science subject being taught. Another section received only half as many television programs and a third section served as a control group. All pupils took 109-item objective pre- and posttests, and television pupils also took a 10-item objective test at the end of each science lesson.

Both television groups made significantly greater improvement than the control group. However, the group which viewed twelve television lessons showed significantly greater improvement than the group which viewed 20 television lessons.

Engelhart, Max D., Edward C. Schwachtgen, and Mary M. Nee. Report on the instruction experiment in high school physics in the Chicago public schools. Chicago: Chicago Public Schools, 1957. American Journal of Physics, 26, 347-349 (September, 1958).

Problem: determine the effectiveness of physics kinescopes with ability ranked students.

Sample: 1498 Chicago high school students.

Subject taught: physics.

Key variables: kinescope and face-to-face presentation, learning by ability matched students.

Physics I was taught to 692 students by television and to 906 students by face-to-face instruction. Four experimental and control groups of 307 students each were selected from scores on Otis intelligence test. Specially constructed physics test administered to both groups. Test contained 140 items.

The average score for both the kinescope and face-to-face groups was 71 for one set of 307 students. Second group of 307 students had test means of 69 for kinescope instruction and 72 for face-to-face instruction. Students of IQ above 120 and students of IQ below 100 scored relatively lower with kinescope instruction than with face-to-face instruction. The conclusion is drawn that students with IQ above 120 and below 100 profit relatively more from face-to-face instruction than kinescope instruction.

Erickson, Carlton W. H. Teaching general science through film production. Unpublished Doctor's dissertation, Boston University, Boston, 1955. (See also Audio Visual Communication Review, 4 (1956), 268-278.)

Problem: determine the relative effectiveness of teaching by film presentation and film production, and to determine students' attitudes toward each method.

Sample: 55 students in West Hartford, Conn. junior high schools.

Subject taught: general science.

Key variables: film presentation and film production, learning, attitudes.

Two classes were taught general science by two different teachers. During the first half of the semester, one teacher used eight motion pictures in addition to texts and problems, while the other teacher's class produced a film instead of viewing some, but used the same texts and problems. For the second half of the semester, the teachers switched treatments.

Students producing the film received significantly lower scores on objective science information posttests than those viewing the films. There were no significant differences between groups in retention scores. Students liked the production treatment better. Generally, students thought they learned more from the viewing than production treatments.

It is probable that students in the production treatments learned more non-science information and techniques (e.g., writing skills, film production) than students in the viewing treatments.

Erickson, Clifford G. and Hymen M. Chausow. Chicago's TV College: Final Report of a Three Year Experiment.[1] Chicago: Chicago City Junior College, August, 1960.

Problem: comparative effectiveness of TV and face-to-face instruction.

Sample: 28,874 junior college students.

Subjects taught: English, Social Science, Biology, Political Science, Mathematics, Physical Science, Accounting, Shorthand, Humanities, Psychology, American Literature, Music, Speech, Astronomy, Business Law, Languages.

Key variables: TV only, TV plus face-to-face, face-to-face instruction. Student reaction.

[Note: This is a summary of the achievement comparisons in the controlled experiments only. The original study contains a complete description of the project including comparative costs of TV and face-to-face instruction, and a review of the various research techniques used.]

Achievement comparisons for first two years. The experimental design focused on comparing the achievement of TV students at home with students in face-to-face classroom situations. In the first year comparisons were made between TV at home students and regular day classroom students. Some attention was also given to sections on the campus which were taught by a combination of TV lectures with face-to-face follow-up discussion sessions.

In the second year, comparisons were made between TV at home students and face-to-face taught evening students. These evening students were more closely matched to the TV at home students in terms of age and motivation than were the regular daytime students. Some experiments attempted to hold the teacher variable constant by having the TV teacher teach face-to-face control sections.

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[1] For a detailed report of the first two years of this project see:

Erickson, Clifford G. and Hymen Chausow. Chicago's TV College: Report of the First Year of a Three Year Project. Chicago: Chicago City Junior College, 1958.

________. Chicago's TV College: Report of the Second Year of a Three Year Project. Chicago: Chicago City Junior College, 1959.

2--Erickson, Clifford G. and Hymen M. Chausow

__First-year results__. No significant differences were noted between the TV, TV plus face-to-face, and the face-to-face groups except for the Biology class. The results were:

Class	Instruction Method	N	Criterion	Score	Analysis Technique	Significance
English 101	TV-Home	354	Final Exam	75.41	Covariance	NSD
	TV-Class	32	Final Exam	72.08	Covariance	NSD
	Face-to-face	101	Final Exam	71.13	Covariance	NSD
Social Science 101	TV	90	Final and Midterm	158.45	Matched Pairs	NSD
	Control	90		153.33		
Biology 101	TV-Home	259	Final Exam	110.31	Analysis of Variance	Favor TV-Home .05 level
	TV-Class	54		94.04		
	Face-to-face	98		101.01		
Political Science	TV-Home	244	Final Exam	108.69	Analysis of Variance	NSD
	TV-Class	51		106.83		
	Face-tc-face	58		107.41		
English 101 (second offering)	TV-Home	33	Final Exam	23.85	Matched Pairs	NSD
	Face-tc-face (evening)	33		23.79		
English 102	TV-Home	69	Final Exam	21.75	Analysis of Variance	NSD
	Face-to-face	24		21.95		
Social Science 102	TV-Home	45	Final Exam	74.64	Matched Pairs	NSD
	Face-to-face (evening)	45		73.89		
Biology 102	TV-Home	153	Final Exam	110.16	Analysis of Variance	Favor TV-Home .05 level
	Face-to-face	153		106.30		
Mathematics	TV-Home	28	Final Grade (A = 4.0)	2.97	Covariance	NSD
	Face-to-face	28		3.17		

3--Erickson, Clifford G. and Hymen M. Chausow

Second-year results. No significant differences were found except for Humanities and Biology. Both differences were in favor of the TV group. The summarized results are:

Class	Instruction Method	N	Criterion	Score	Analysis Technique	Significance
Accounting 101	TV Control	53 44	Final and Midterm Exams	*79.38 *76.05	Covariance	NSD
**English 101-102	TV Control	53 40	NA NA	NA NA	Covariance	NSD
Humanities 201-202	TV Control	69 73	Exams and Final	*379.16 *345.73	Covariance	.01 favoring TV group
**Social Science 101	TV Control	56 23	Critical Thinking Posttest	*29.00 *26.47	Covariance	NSD
Biology 101	TV Control	26 26	Exams and Final	NA	Covariance	Favor TV .05 to .10 level
Biology 102	TV Control	153 153	Exams and Final	NA	Covariance	Favor TV .05 level
Child Psychology	TV Control	46 46	Final Exams	74.46 69.89	"t" test	NSD
Shorthand	TV Control	26 64	Final Exams	109.22 104.64	NA	NSD

*Scores adjusted for pre-instruction individual differences.

**TV and Control section for each course taught by same teacher.

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Achievement comparisons for the third year. The first two years of the experiment compared achievement of TV at home students with that of students taught face-to-face in the classroom. In the third year, experimentation was undertaken to use the TV series for direct instruction of classroom groups of normal college age daytime students. Experimental and control sections were matched as carefully as possible or made equivalent through random selection. Comparisons were continued for adult age afternoon, evening, and home TV students.

The results were:

Class	Instruction Method	N	Criterion	Score	Analysis Technique	Significance
Social Science 102	TV-Home	29	Examinations	129.13	Covariance	Favored TV-home group .01 level
	TV-Class	29		113.01		
	Face-to-face	29		121.00		
Physical Science 101	TV-Home	NA	Examinations	212.41	Covariance	See Notes*
	TV-Class I**	NA		215.01		
	Face-to-face I	NA		230.85		
	TV-Class II	NA		118.47		
	Face-to-face II	NA		185.29		
Humanities 201	TV-Class	31	Examinations	176.16	Covariance	NSD
	Control***	44		181.11		
Humanities 202	TV-Class	20	Examinations	152.01	Covariance	SD .01 level favoring face-to-face
	Control	31		176.10		
Psychology	TV-Home	60	Examinations	187.27	Covariance	See Notes****
	Face-to-face (afternoon)	30		178.83		
	Face-to-face (evening)	21		164.48		
	Combined face-to-face	51		172.92		
Mathematics	TV-Home	35	Examinations	140.23	"t" test	SD .01 level favoring TV-Home
	Face-to-face (evening)	30		122.76		
Speech	TV-Home	17	Examinations	118.34	Covariance	SD .01 level favoring TV-Home over either face-to-face
	TV-Class	15		109.65		
	Face-to-face (day)	48		106.19		
	Face-to-face (evening)	37		105.68		

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NOTES

*I refers to class meeting at Wright Branch of Chicago Junior College.

II refers to class meeting at Wilson Branch of Chicago Junior College.

**On pretest measure of Otis and Subject matter showed a significant difference in groups before instruction (.01 level).

Using adjusted mean scores for covariant analysis the following were significant:

Wright TV-Home differed significantly from Wright Face-to-face at the .05 level. All others were non-significant.

***Control groups were daytime students meeting in face-to-face classes in classrooms on the campus with same instructor as TV.

****TV favored at .01 level over evening class. Afternoon class favored over evening class at .05 level. Different instructors for all three methods of instruction.

Conclusions. The authors conclude after the three years of study that:

1. College courses can be successfully presented over open-circuit TV without adjustment of the primary objectives or learning materials.
2. Classroom standards of instruction and evaluation can be maintained for courses taught to students in the home by open-circuit TV.
3. While significant differences for both TV and face-to-face instruction were frequently found in the studies, the authors felt these differences were based within the teaching-learning situation itself. More differences between variables in a teaching-learning situation exist than do variables in a teaching method.
4. "When evaluated by the techniques of measurement and analysis used in this experiment, television instruction is a thoroughly effective means of extending college opportunities to at-home students in all subject areas explored in the project."

Evans, Richard I. An examination of students' attitudes toward television as a medium of instruction in a psychology course. Journal of Applied Psychology, 40 (1956), 32-34.

Problem: Does experience with a TV-taught course motivate students to take other TV-taught courses, and what effect do live face-to-face discussion sections have on student-teacher relationships?

Sample: 74 college students.

Subject taught: Elementary Psychology.

Key variables: Student attitude toward TV as means of instruction, and contact sessions with TV teacher.

The attitudes of Ss toward television instruction enrolled in an elementary psychology course taught partly by television and partly through on-campus discussion groups were determined. Seventy per cent of the Ss revealed an interest in taking another course involving television instruction, 13 per cent would not do so, and 16 per cent were undecided. Among the "open-end" question responses, a feeling was revealed that television lectures were better developed than traditional classroom lectures, involved fewer disturbing interruptions from students, but lacked opportunities for class participation and were subject to technical electronic interruptions.

The attitudes toward supplementary class discussions revealed responses which favored them in 42 per cent of the cases and felt them of no appreciable importance to learning in addition to television lectures in 56 per cent of the cases. Two per cent of the Ss were "Undecided" concerning their value. Among these "open-end" question responses it was reflected that their importance centered around advantages gained through some face-to-face contact with the instructor for those favoring them, and the feeling that television lectures were sufficiently complete in themselves by those who found no need for them.

Evans, R. I. An exploratory investigation of the psychological and educational impact of a filmed dialogue with Carl Jung. Conversations with Carl Jung and Reactions from Ernest Jones. Princeton. D. Van Nostrand, 1964. pp. 159-168.

Problem: determine the relative effectiveness of a filmed interview and printed communication on student learning and attitude change.

Sample: 40 psychology of personality seniors and 22 experimental psychology sophomores.

Subject taught: a one-hour filmed interview with Carl Jung.

Key variables: learning, ability, attitude, personality, and filmed and printed communication presentations.

In the middle of the semester the psychology of personality seniors took a pre-achievement standardized test based on the content of the interview and the vocabulary scale of the WAIS. Students were then divided into two groups on the basis of pre-achievement and WAIS scores. Six weeks later, one group saw the filmed interview and the other group read the printed transcription of the film. Both groups then took the achievement test. Both groups learned significantly from their presentation (.01 level), but the difference between groups was not significant.

At the beginning of the semester, 22 experimental psychology sophomores took a semantic differential (evaluative factor) instrument to assess attitudes toward interviewing as a teaching device, toward Carl Jung as a person, and toward a group of his theoretical concepts.

The sophomores were also administered the Rosenzweig PF, Taylor Anxiety, Wesley Rigidity, Edwards PPS, the F-Scale, the TAT, and the Allport-Vernon Study of Values scales. Two months later this group saw the Jung filmed interview and took the semantic differential scales again.

Students' attitudes toward all three concepts on the semantic differential changed significantly after seeing the film. Some students shifted favorably toward Jung as a person but remained neutral or reacted unfavorably toward his theoretical concepts; other students reacted unfavorably toward Jung but favorably toward his concepts. There was a significant negative correlation between rigidity (Wesley Rigidity scores) and change in attitude. Scores on the Rosenzweig PF test tended to indicate that extrapunitiveness was positively associated and impunitiveness was negatively associated with attitude change. Scores on the Allport-Vernon Study of Values seemed to indicate that students emphasizing social values were more favorable toward Jung, whereas students emphasizing aesthetic values changed less.

This investigation becomes a model of how the interaction between learning, attitudinal, and personality variables can be explored in social psychological impact research.

Evans, Richard I., H. Burr Roney and Walter J. McAdams. An evaluation of the effectiveness of instruction and audience reaction to programming on an educational television station. Journal of Applied Psychology, 39 (1955), 277-79.

Problem: achievement differences in TV only, face-to-face, and combined TV and face-to-face interaction.

Sample: 221 college students.

Subjects taught: Elementary Psychology and Elementary Biology - University of Houston.

Key variables: TV, face-to-face, and combined TV and face-to-face learning changes.

PSYCHOLOGY

Ninety-six students enrolled in face-to-face Psychology class, 17 enrolled in TV section which received lectures over ETV Station KUHT, Houston, Texas, and completed correspondence problems mailed in to instructor, 30 enrolled in TV section which received lectures via TV station but came to campus for two discussion sections per week. Achievement evaluated on basis of 150-item standardized final examination. Mean final examination scores were (1) face-to-face class: 96.11, (2) TV plus correspondence: 98.00, and (3) TV plus campus discussions: 99.04. Same instructor used for all sections of the course. Fisher "t" test showed no significant statistical difference between mean examination scores. Authors conclude TV is as effective a means of instruction as face-to-face.

BIOLOGY

Two groups matched on basis of college class, grades, and sex, each numbering 78, were taught Elementary College Biology by the same instructor. One group taught face-to-face, the other received instruction lectures by TV, discussions met face-to-face twice a week. Achievement was measured on 70-item objective type mid-semester examination. Mean score for face-to-face group was 50.17 and for TV group was 45.82. Authors reported no statistically significant difference for matched groups. Authors conclude TV is equally effective means of instruction with face-to-face instruction for College Elementary Biology.

An additional part of this study is the reaction of the Houston, Texas ETV audience to educational television programming. It is not reported in this abstract. See original study for this data.

Evans, Richard I., Ronald G. Smith and William K. Colville. The university faculty and educational television: hostility, resistance, and change. A social psychological investigation in depth. USOE Project Number 051. Houston: University of Houston, 1962.

Problem: to determine attitudes of university professors toward ITV before and after participating in making video-tapes, as a natural field setting exploration of the forced compliance dimension in Festinger's Dissonance Theory.

Sample: 319 professors at a large, urban southwestern university.

Key variables: Participation, attitudes, self-concept and other personality and behavioral measures

Professors were administered a semantic differential instrument to determine attitudes toward ITV and a number of other concepts related to the university instructional complex as well as self-concept items. From analysis of this, the sixty most favorable and the sixty least favorable professors were selected. These were interviewed in depth, exploring both personality and instructional variables. Members of two complete university departments (n = 20) that had resisted ITV were selected to prepare, produce and present several video-tapes as a self-teaching-improvement device.

Chi square technique determined significance of intergroup differences, and questionnaires were subjected to a quartimax factor analysis. Among the findings was an indication that 85 per cent of the faculty regarded themselves as good teachers, although student responses were significantly less favorable. Pro-ITV teachers were significantly more variable in teaching and evaluation techniques, more interested in research, had more teaching experience, were more tolerant of psychological interviews, night students, and student activities; were less concerned about economic rewards, and were less likely to have colleagues who agreed with their views.

The attitudes of the members of the two departments who participated in the video-tape project were modified in a direction more favorable to ITV. One department that had participated in the video-tape project decided to do an ITV course; one is now using the taped materials in conjunction with traditional instruction.

Evans, Richard I., Betty A. Wieland and Charles Moore. The effect of experience in telecourse on attitudes toward instruction by television and impact of a controversial television program. Journal of Applied Psychology, 45 (1961), 11-15.

Problem: effect of previous experience in telecourses on attitudes toward TV as an instructional medium.

Sample: 160 University of Houston students.

Subject taught: psychology.

Key variables: attitude toward TV as a medium of instruction, experience in TV-taught classes.

Two groups of students were selected on the basis of prior experience in television-taught courses. Forty-five students had enrolled in TV classes and received grades in these classes, and 115 students had no prior experience in TV-taught courses. A modified Osgood type semantic differential (Evaluative Dimension) test was administered to all subjects. The "t" tests for the differences between the means of the two groups were not significant.

The good-bad scale on the Osgood test was used to evaluate attitudes toward concept related to methods of course presentation by classroom lecture and television lecture.

A "t" test of the median values of the TV-experienced group yielded a difference significant at the .01 level. This difference favored classroom instruction. Authors infer that exposure to TV as a means of instruction results in a less favorable attitude toward it, but they also suggest an alternate conclusion that attitude toward TV may be a result of grades earned in the course. (A phi coefficient between attitude and grades was calculated. This coefficient was .36 and significant beyond the .01 level.)

The contention proposed here is that, if all related variables (e.g., attitude toward the instructor, the subject matter itself, general motivation arousal characteristics of the course) could be held constant, television as a teaching medium would take its place along side other educational media; that is, they are all equally well received in proportion to the extent that effective learning principles are implemented in their use.

This same study reported the extent to which a single educational TV program could change attitudes of ETV viewers toward a controversial subject. See original study for this data.

Ford Foundation and the Fund for the Advancement of Education. The National Program on the Use of Television in the Public Schools [n.p.] Report of the Second Year 1958-59. NAEB Research Fact Sheet, Series I, 92, NAEB Journal, 20 (July 1961) 1-2 (Abstract).

Problem: comparative effectiveness of TV and face-to-face teaching.

Sample: 1st year: nearly 40,000 students in more than 200 schools; 2nd year: an increased number of both participating schools and students.

Some of the subjects taught: social science, science, physical education, safety, history, English, mathematics, chemistry, physics.

Key variables: TV teaching, face-to-face teaching.

After the first two years, students in large TV classes learned as much as, and in many cases significantly more, than students of equal ability in face-to-face taught classes.

Fordham University. Training by television: The comparative effectiveness of instruction by television, television recordings, and conventional classroom procedures. SDC Report 476-02-2. Port Washington, New York: Special Devices Center. Audio-Visual Communication Review, 1 (1953), 61. (Abstract)

Problem: determine the relative effectiveness of television, kinescopes shown on television, and face-to-face instruction; the factors that determine superior programs, and attitudes.

Sample: Naval trainees.

Subject taught: training lessons.

Key variables: narration and animated presentations; learning and attitudes; face-to-face, ITV, and kinescope methods.

Live television and kinescopes were superior to face-to-face presentations; there were no significant differences between live television and kinescope presentations.

Direct narration was superior to animated sound film, but the combination of direct narration and animated film was not as effective.

Trainees were generally favorable toward television.

Frazier, Alexander and Lewis D. Evans. Testing the effectiveness of two-purpose television programs in contributing to both teacher and pupil learning (Elementary Science). USOE Grant Number 7-33-045.00. Columbus: Center for School Experimentation, Ohio State University, December 27, 1960. (Offset)

Problem: determine effectiveness in teacher and pupil learning by ITV.

Sample: 151 teachers and 4814 third- and fourth-grade pupils from Columbus, Ohio and nearby schools.

Subject taught: elementary science.

Key variables: attitude, pupil interest, achievement; ITV presentation.

Pupils and teachers saw ten half-hour ITV lessons on elementary science. Teachers took a pre- and post-attitude questionnaire, and 20 teachers were interviewed. Teachers also evaluated the program using an 18-item questionnaire. Fourth-grade pupils took the STEP.

Teachers significantly increased their feelings of confidence in teaching elementary science (.01 level). Teachers were willing to have further consulting services for other areas besides elementary science. Teachers reported pupils showed more interest in science, asked a wider range of questions, and brought more material to class. There were no significant differences in fourth-grade pupils' achievement scores over the time of the study. Some teachers thought that half-hour programs were too long for third graders.

Frank, Joseph Henry. An evaluation of closed circuit television for interceptor pilot training. Unpublished Doctor's dissertation, Indiana University, Bloomington, 1955.

Problem: determine the relative effectiveness of understanding and remembering weather conditions when presented by audio alone and by television.

Sample: Air Force trainees selected at random during their training period.

Key variables: television and audio-alone presentation; learning, and attitudes.

Subjects at Tyndall Air Force Base, Florida, received six sets of weather briefings, either by audio only or by audio and by television presentation (showing weather charts). The audio portion of each of the treatments was the same. Information retained by the trainees of the weather presentation was determined by a short test having four multiple-choice and one problem-solving question.

Analysis of variance results showed no significant differences in test scores among the three situations (different kinds of training "planes") in which the trainees were tested. After pooling the test scores, it was found that trainees receiving the weather by television had significantly higher scores on the information tests (.01 level) than did those receiving the audio only. An attitude questionnaire also showed that subjects favored the television presentation more than they did the audio only presentation.

French, Joseph L. A comparison of student attitude in three instructional conditions: small classroom, instructional television, and large lecture hall. [Columbia:] University of Missouri, August 21, 1963. (Mimeographed)

Problem: determine students' attitudes toward small classroom, ITV, and large classroom presentations.

Sample: first semester, 94 students in two classrooms; second semester, 74 ITV students; fourth semester, 167 ITV students; fifth semester, 237 students in a large lecture room.

Subject taught: social foundations of education.

Key variables: face-to-face presentation in small classrooms, ITV presentation, and face-to-face presentation in a large classroom; attitudes.

The first semester, students were taught in a small classroom. The next three semesters, the course was presented on ITV. The fifth semester, students were in a large lecture room. The same professor taught all sections. There were no significant differences between group means in scholastic aptitude, GPA, previous coursework pattern, or age. Scholastic aptitude means for all four groups were about one-half a standard deviation above the mean for University freshmen; none of the students were on probation and all were enrolled for twelve hours or more of coursework. Attitude scales were developed from those used in another study. (See abstract of Neidt and French.) Likert scales were constructed to measure attitudes toward method of instruction, teacher, and subject. A semantic differential instrument was used to determine teacher characteristics, and a Q-sort to make a teacher rating. The Q-sort involved students arranging 22 statements about a teacher in an "ideal" order, and a week later in an order describing their education teacher. All attitude scales were given shortly before the end of the course.

2--Joseph L. French

The attitude scales intercorrelated as follows:

	2	3	4	5
1. Method (Likert)	.67	.59	.52	-.04
2. Teacher (Likert)		.58	.74	.03
3. Subject (Likert)			.40	.06
4. Teacher Characteristics (sem. diff.)				.04
5. Teacher Rating Scale (Q-sort)				

t-tests on the scores of the instruments numbered above yielded the following significant differences: (1) face over TV$_2$, face over large lecture, TV$_1$ over large lecture, TV$_2$ over large lecture; (2) face over TV$_2$, face over large lecture, TV$_1$ and TV$_2$ both over large lecture; (3) face over large lecture, TV$_1$ over all presentations, and TV$_2$ over large lecture; (4) face over all presentations, and TV$_2$ over large lecture; and (5) face over TV$_2$, and TV$_2$ over lecture. (TV$_1$ and TV$_2$ indicate first and second experimental presentations over ITV which were made the second and fourth semesters of the experiment.)

Fullerton, Billie J. The comparative effect of color and black and white guidance films employed with and without "anticipatory" remarks upon acquisition and retention of factual information. Unpublished Doctor's dissertation, University of Oklahoma, Norman, 1956.

Problem: determine retention using black and white and color films with and without anticipatory remarks.

Sample: 551 eleventh and twelfth grade students from Clinton, Elk City, Hydro, and Weatherford, Oklahoma.

Subjects taught: Library Organization, Heredity and Environment, Choosing Your Occupation, Your Earning Power.

Key variables: black and white, color, and anticipatory remarks; learning, and retention.

Students were randomly assigned to five groups: the first group saw color films, the second group heard anticipatory remarks and saw color films, the third group saw black and white films, the fourth group heard anticipatory remarks and saw black and white films, and the fifth (control) group received no instruction. All students took a factual information test before, immediately after, and six weeks after the screenings.

Analysis of covariance technique indicated that the scores of students in the black and white groups were significantly higher than the scores of students in the color group on both the immediate and delayed posttests. Scores of students in the films-only group were significantly higher than scores of students in the anticipatory remarks group on both the immediate and delayed posttests.

Fulton, W. R. and O. J. Rupiper. Selected vicarious experiences versus direct observational experiences of pre-service teachers in the foundation areas of professional preparation at the University of Oklahoma. USOE Grant Number 734031.00.10.21. Norman: College of Education, University of Oklahoma, 1961. (Offset)

Problem: determine the relative effectiveness of film and slide sequences and direct observation.

Sample: about 270 students in three education classes at the University of Oklahoma.

Subjects taught: The School in American Culture, Human Growth and Development and Educational Evaluation and Guidance.

Key variables: film and slide sequences and direct observation; attitude, and learning.

Students and teachers were randomly assigned to either film and slide or direct observation treatments. Some films were selected from existing films; other films and slides were specially produced. All students took the SCAT and MTAI as pre- and posttests, and the Sims Social Class Identification Occupation Rating Scale was administered as a pretest. The time given to films and direct observations was the same.

Achievement tests for each of the three courses were constructed and the low discriminating items were culled out. Odd-even split-half r's with Spearman-Brown prophecy formula were .78 (SE_m = 3.84), .62 (SE_m = 4.20), and .62 (SE_m = 4.28) for the School in American Culture, Human Growth and Development, and Educational Evaluation and Guidance courses respectively. Achievement test scores correlated .45, .57, and .50 with final grades in the courses.

Analysis of covariance technique indicated no significant differences among any of the three courses for either of the two treatments, except that in the School in American Culture course, the film and slide group made significantly higher scores on the posttest than the direct observation group (.01 level).

It was concluded that in basic professional education courses, observational experiences by films and slides are more effective than direct observation. In later courses, educational concepts could be acquired as effectively through films and slides as by direct observation.

Garry, Ralph J. Report of research on the integration of science teaching by television into the elementary school program. USOE Grant Number 719008.09. Boston: Boston University, October 31, 1960. (Mimeographed) (See studies by Homer J. Dietmeier, Mary E. Kraft and A. Cornelia Sheehan.)

Garry, Ralph and Edna Mauriello. Summary of research: Parlons Francais I, II, III (Videotape edition) and Parlons Francais I (film edition). [n.p., n.d.] (Mimeographed) See also: Summary of research on "Parlons Francais": First-year program. USOE Grant Number 719021.09, September 14, 1960, and Summary of research on "Parlons Francais": year two. USOE Grant Number 719112 [n.d.]. Both published at Boston: Massachusetts Council for Public Schools. (Mimeographed)

Problem: determine the effectiveness of teacher preparation, follow-up practice of pupils, and teachers' "fluency".

Sample: See below.

Subject taught: French.

Key variables: Teachers' fluency, kind and amount of follow-up practice, and teachers' preparation.

The research covered seven projects, as follows: (A) (Level I videotape): 56 fourth-grade public school classes in suburban communities near Boston were studied for (1) effects of fluency of classroom teacher, (2) using tape recordings of program sound track vs. live follow-up practice, and (3) the value of televised teacher preparation programs; (B) (Level I videotape): using 20 fourth-grade public and parochical school classes in Boston, this study repeated project A to determine (1) differences in achievement between urban and suburban children, (2) the effectiveness of disc vs. the tape recordings in project A, and (3) the stability of the previous results; (C) (Level I videotape): using grades 1-6 in parochial schools, this study determined performance differences of classes beginning the course at different levels; (D) (Level II videotape): using 40 fifth-grade suburban public school classes in the second year of Parlons Francais, this project studied (1) effects of teachers' fluency, (2) the relative value of follow-up practice with records vs. live practice, and (3) the value of special teacher recordings as teacher preparation devices; (E) (Level II videotape): using 19 sixth-grade public schools classes, this project studied proficiency after three years' study, of groups in projects A and D. Performance of each group was compared (1) with groups under each other category, (2) with a control group which had had mixed types of practice, and (3) with all other groups; (F) (Level III videotape): over 200 sixth-grade classes (8000 pupils) in public and parochial schools were given group listening comprehension and reading tests. Teachers filled out a questionnaire on their previous experience with French, the amount and type of follow-up practice used, their attitudes and their students' attitudes toward French, etc.; (G) (Level I film): 1750 fourth-grade students in public and parochial schools in six areas took a group listening comprehension test.

In the first three projects, all classes saw two 15-minute French programs and had two 15-minute follow-up periods each week. Half the teachers organized and directed their own practices and the other half used recordings for follow-up. Fluent teachers averaged three years or more of high school or college training in French, while the non-fluent group had little or no formal French study. In projects A and E, half the teachers were provided weekly half-hour programs by TV, the others none; in project D, half the teachers were provided with special records to increase their French fluency, the others none. Teachers were randomly assigned to classes. Students in projects A-E took a multiple-choice listening comprehension test.

For projects A, B, D, E, F, and G, classes having 30 minutes or more follow-up each week scored significantly higher than those with less. Scores on the intelligence test used were a poor predictor of achievement of first level Parlons Francais. Comparable results were achieved when the course was started at any one of grades 1-6. The effect of missing programs was greatest at the first level. Over a three-year period, however, the effect of missing programs was not a significant factor in individual achievement. Boys' achievement was equal to girls'.

Total test scores of students with moderately fluent teachers were significantly higher than those of students with non-fluent teachers (project D). Over a two- or three-year period, students of moderately fluent teachers performed better than those of non-fluent teachers in listening comprehension, rhythm and intonation, and spontaneous usage, and this distinction was particularly significant at the third level (projects E and F). Pronunciation and listening comprehension scores of students of non-fluent teachers during either of the first two levels was equal to scores of students of moderately fluent teachers. Classes taught by teachers who were enthusiastic toward French scored significantly higher than those taught by non-enthusiastic teachers. Children in classes of teachers who watched TV teacher preparation programs regularly performed no better than classes whose teachers did not (projects A, E, F, and G). There was no relationship between teacher's fluency and the attitude of his students toward French.

Classes of moderately fluent or non-fluent teachers using recordings regularly had better results in rhythm and intonation than classes which did not. In (B), students with moderately fluent teachers had higher achievement in pronunciation and spontaneous usage with live follow-up practice than with recordings, but non-fluent teachers had better results in these areas using recordings.

Over a three-year period, classes having the greatest variety of follow-up practice achieved higher scores than those having only one type (projects A, D, and E).

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Geddes, Dorothy Clara. The use of television in teaching tenth year mathematics: the effectiveness of teaching tenth year mathematics by television and a classroom teacher as compared with the traditional method of instruction by a single classroom teacher. Unpublished Doctor's Dissertation, New York University, New York, 1961.

Problem: compare the effectiveness of teaching tenth-grade mathematics by face-to-face and television, or by face-to-face methods.

Sample: 232 students in five public New York high schools.

Subject taught: tenth-grade mathematics.

Key variables: television and face-to-face presentation; attitudes, and achievement.

Two intact classes from each school were used as experimental and control groups. The experimental classes saw three 30-minute telecasts each week for a year and had face-to-face instruction the rest of the time. The control group had face-to-face instruction only. The same teacher taught both sections in each school. All students took the Shaycoft Plane Geometry Test and the Tenth Year Mathematics Regents Examination as criterion variables. Students took the Watson-Glaser Critical Thinking Appraisal and Multiple Aptitude Tests 8 and 9 as pre- and posttests. Students also took an attitude toward mathematics instrument as pre- and posttests, and an evaluation of television (degree of instructiveness, quality of instruction, and adequacy of televising) instrument as a posttest.

There were no significant differences between face-to-face and face-to-face and televised instruction as determined by scores on the Watson-Glaser, MAT, Spacial Relations, and on the achievement measures. Students' and teachers' attitudes were generally favorable.

Glasgow, M. W. A study of the relative effectiveness of selected approaches to the in-service education of teachers in the utilization of in-school radio and television broadcasts. USOE Project Number 253. Norman: University of Oklahoma [n.d.] (Offset)

Problem: determine the relative effectiveness of four methods of in-service education in using radio and TV in the classroom.

Sample: 181 elementary and secondary schoolteachers and their pupils.

Subject taught: using radio and TV in the classroom.

Key variables: workshops, supervisory visits, printed material, films and tapes.

Teachers were randomly assigned to one of four methods of in-service training: workshops, supervisory visits, printed material, films and tapes.

Pupils in each course took achievement tests. Odd-even split-half r's using the Spearman-Brown prophecy formula were: Algebra, .79; Chemistry, .89 and .89; Elementary Science, .97 and .82; H. S. Mathematics, .92; Oklahoma History, .92 and .92; Physics, .86 and .86; Social Studies, .77 and .83; and U. S. History, .87 and .87. Two reliabilities given for the same course indicates measurement at two different years. Teachers completed a 20-item questionnaire.

Analysis of variance indicated no significant differences in pupils' scores for any of the four training methods. Teachers were favorable to an in-service program and consistently preferred the workshop to the other (visits, printed material, films and tapes) methods.

Glock, John William. The relative value of three methods of improving reading -- tachistoscope, films, and determined effort. Unpublished Doctor's dissertation, University of Nebraska, Lincoln, 1955.

Problem: determine the relative effectiveness of using a tachistoscope, films and determined effort to improve reading.

Sample: about 100 pupils.

Subject taught: reading.

Key variables: tachistoscope and film presentation and determined effort, learning of reading skill.

Pupils were divided into four groups: a control group of 37 pupils, and three experimental groups of about 20 pupils each. One group followed the instruction manual for the Keystone tachistoscope, another group saw a series of reading films prepared by Dr. James B. Stroud of the State University of Iowa, and a third group, the "determined effort" group, used interesting reading materials, studied vocabulary, and listened to periodic talks from faculty members emphasizing the importance of improvement. All students took the Iowa Silent Reading Test before and after the experiment, and the Robinson-Hall Test of Reading Ability for History at the end. The three experimental groups were matched on reading test scores, on an intelligence measure, and on grade averages. Analysis of variance indicated no significant differences among the three groups on these criterion measures.

Using scores on three reading tests, analysis of covariance technique indicated the determined effort group had a significantly higher reading rate than the other two groups at the end of the four-month experimental period. The determined effort group also had significantly higher comprehension of the material.

Gordon, Morton J. Television education in elementary school speech improvement. USOE Project Number 425. [n.p., n.d.] (offset)

Problem: determine the relative effectiveness of face-to-face and television presentation.

Sample: 535 third-grade pupils in 16 Oahu schools.

Subject taught: five speech sounds: [θ, ð, I, E, U]

Key variables: face-to-face and television presentation, retention, racial ancestry, size of groups.

CTMM scores were available for all pupils. All pupils took an adaptation of the Bryngelson-Glaspey speech improvement test, with 26 pictures and 34 sentences. Intercorrelations of four selected judges on a sampling of 29 pupils were .83, .87, .88, and .89. One group had 15-minute ITV speech lessons two days a week and had face-to-face lessons three days a week. Another group had similar lessons all by face-to-face presentation, and a third group received no special training except as ordinarily provided by the Hawaii school curriculum.

At the end of the training program, all students took the speech test as a posttest. Pupils in the television and face-to-face groups had significantly fewer errors than pupils in the group receiving no special training, but there were no significant differences between television and face-to-face pupils receiving special training. These relative standings persisted four weeks later.

Gordon, Morton J. Third grade television-classroom articulation program. Journal of Speech and Hearing Disorders, 25 (1960), 398-404.

Problem: effectiveness of TV in presenting remedial speech training.

Sample: 169 pupils in 20 Hawaiian schools.

Subject taught: Remedial Speech.

Key variables: improvement in articulation of θ and ð sounds, TV teaching, face-to-face teaching.

Eighty-seven students with articulation problems in nine experimental groups were taught remedial speech by viewing two televised lessons, 15 minutes long, each week and attending three face-to-face lessons each week. Eighty-two students with the same articulation problems in nine control groups were taught remedial speech by their regular classroom teacher in five face-to-face sessions, 15 minutes long, each week. Recordings were made of all students with articulation problems and evaluated by a jury of experts to determine similarity of experimental and control groups. Classroom teachers followed a syllabus of keeping experimental and control group routines comparable.

Two weeks after instruction, all students were retested and tape recorded. The same jury that originally evaluated the students evaluated the improvement in articulation after instruction.

Results. Scores from the California Short Form Test of Mental Maturity were used to determine language IQ differences. There was no significant difference in IQ for the two groups. Scores for articulation improvement were obtained by subtracting the number of posttest articulation errors from the pretest articulation errors. The TV-taught group mean was 9.8 and the face-to-face taught group mean was -0.4. The negative score means students made more errors on posttest than pretest. This difference was significant in favor of the TV group at the .001 level. Male students in the TV-taught group differed significantly from the male students in the face-to-face taught group more than female students in the same groups.

Conclusion. TV teaching of remedial speech by a trained speech correctionist produces significantly more improvement in articulation than face-to-face teaching of remedial speech by the regular classroom teacher.

Gordon, Oakley J., Keith M. Engar and Donald R. Shupe. Challenging the superior student by making the study of Russian available in the elementary school curriculum via television. USOE Grant Number 7-54-0050-024. Salt Lake City: University of Utah, 1963.

Problem: determine the relative effectiveness of learning by face-to-face and television presentation; students' attitudes toward television, and the relative effectiveness of challenging superior pupils.

Sample: 395 fourth- and fifth-grade pupils taking Russian and 205 fourth- and fifth-grade pupils not taking Russian. Of those taking Russian, all but 54 took it by television.

Subject taught: Russian.

Key variables: television and face-to-face presentation; attitude, ability.

All pupils took the Pintner-Durost General Ability Test, and fourth-grade pupils took the Metropolitan Achievement Test. Pupils' grades were also available in four subject matter areas, and the classroom teacher evaluated each pupil twice a year on a 39-item dichotomous response questionnaire having three factors: "self-initiated drive," "leadership," and "emotional control." Pupils enrolled in Russian also took Russian achievement tests and oral tests, and twice a year filled in a 7-item questionnaire about interest in the Russian class. Parents also filled out a 25-item questionnaire once during the year. Samplings of Russian classes were filmed, and these films were evaluated as to pupils' interest. Finally measures were also made of SES level and fathers' occupations were determined. The mean IQ of superior students was 121 and of average students was 105. The study was conducted over a three-year period.

Average-ability pupils taking Russian had significantly higher classroom grades than average-ability pupils not taking Russian. A similar finding was found for high-ability pupils. There were no significant differences between classroom grades of average-ability pupils taking Russian and superior-ability pupils not taking Russian.

Pupils taking Russian by face-to-face presentation tended to have higher Russian achievement scores than pupils taking Russian by ITV. Relative performance of ITV pupils might have been a function of the follow-up teacher's teaching abilities.

Pupils' interest in Russian tended to decrease over time. Classroom behavior of superior pupils taking Russian was rated higher than classroom behavior of superior pupils not taking Russian.

Gordon, Oakley J., Edwin C. Nordquist and Keith M. Engar. Teaching the use of the slide rule via television. [Salt Lake City]: KUED, University of Utah, July, 1959. (Offset)

Problem: determine the relative effectiveness of ITV and face-to-face presentation.

Sample: 26 ITV students and 11 face-to-face students the first semester; 17 ITV students and 11 face-to-face students the second semester; 38 face-to-face students from previous semesters.

Subject taught: the slide rule.

Key variables: learning, study time, and on-campus, off-campus, credit, and non-credit students; ITV and face-to-face presentation.

The course was organized into twenty half-hour presentations, and was shown live the first semester and as a kinescope the second semester. The same teacher taught both ITV and face-to-face sections.

Analysis of variance indicated no significant differences in final examination scores between ITV and face-to-face students for either semester.

Analysis of variance run on on-campus first-semester students of high and low grade-point average indicated that high GPA students had significantly higher final examination scores than low GPA students, and that there was a significant (.01 level) interaction between GPA level and presentation method. Mean scores of ITV high GPA students were higher than face-to-face high GPA students, and the reverse was true for low GPA students.

Analysis of variance run on exercises means for 29 on-campus ITV students, 14 off-campus credit ITV students, and 13 off-campus non-credit ITV students indicated a non-significant F ratio, although the on-campus ITV students tended to have higher mean exercises scores than the off-campus credit students, who in turn tended to have higher mean exercises scores than the off-campus non-credit students.

Since the course was offered more than once a day, students were able to view the same lesson more than once if they wished. Face-to-face students viewed about 2 1/2 lectures twice, on-campus ITV students about one lecture twice, and off-campus students about 4 lectures twice. Low GPA students watched repeats more frequently than high GPA students.

There were no significant differences between groups in the amount of studying reported, and no significant correlations between amount of study time and either final examination grade or mean exercises grade, except that the correlation between study time and exercises means for the on-campus ITV group was -.45.

Gork, Edward R. A comparative study of selected elementary schoolteachers' and administrators' attitudes toward instructional television programs and related problems. Unpublished Doctor's dissertation, Michigan State University, East Lansing, 1961.

Problem: determine attitudes and problems of elementary teachers receiving ITV in their classrooms.

Sample: 43 administrators and 189 classroom teachers from 14 different school districts at Michigan.

Key variables: teacher attitude, experience with ITV, teaching experience.

Two questionnaires were mailed out nine months apart; some interviewing was done.

Before receiving ITV, teachers were quite favorable to ITV. This attitude decreased after nine months experience, though it still remained high. Years of teaching experience was not related to attitude. Lack of talkback was considered no problem by 75 per cent. Thirteen per cent were concerned that ITV might decrease teachers' prestige; most regarded ITV as helpful, and as enhancing the learning situation. About 90 per cent expressed the desire to see ITV expand generally, but only two-thirds desired to continue ITV in their own classrooms. Teachers were concerned about the additional time required, and of the inflexibility of the television curriculum.

Administrators were generally more favorable to ITV than were teachers.

Gould, Orrin Everett. The character of observation under closed-circuit television, classroom visitation, and instructional television films in an introductory education course. Unpublished Doctor's Dissertation, University of Minnesota, Minneapolis, 1960.

Problem: determine the relative effectiveness of television, films, and direct observation.

Sample: University of Minnesota students in sections of 25-40.

Subject taught: observation.

Key variables: direct observation, television, and film observational methods; students' perception of educational value, and students' evaluations of effectiveness.

Six sections were randomly assigned among the three treatment methods, and students were randomly assigned to lab sections. Students took the Miller Analogies Test, made reports of perceived incidents of educational significance during observations, took a film test of observation skills, and made a report on observation experiences. Students observed five times a semester by their method and one time by each of the other methods.

The author concluded that the three methods of observation tended to supplement rather than replace each other, that there were no significant differences among methods with respect to educational objectives, and that students tended to favor direct over television observation, but that either of these was preferred over film. The films used were produced by McGraw-Hill and Indiana University.

The pattern of incidents the students perceived varied over treatments. Students were most satisfied with their method whichever it was. There were no significant differences among students in the different groups on film test of observation skills scores.

Grant, Theodore S., et al. Effectiveness of television within the dental laboratory. Theo. S. Grant and Irving R. Merrill, Television in Health Sciences Education. USOE Project Number 064. San Francisco: University of California, San Francisco Medical Center, September 30, 1963. Pp. 28-33. (Offset)

Problem: determine the relative forgetting during a two-day period between lecture presentation and individual laboratory work, and to determine the relative effectiveness of ITV and lecture-slides presentations.

Sample: 59 students in "Crown and Bridge Prosthetics" at the University of California School of Dentistry.

Subject taught: preparation of a tooth in a typodont for a full crown with porcelain veneer facing.

Key variables: ITV and face-to-face plus slides presentation, evaluations of student performance in laboratory work.

Group one received ITV presentation in the laboratory and began lab work immediately. Group two received ITV presentation in the classroom and began lab work after two days. Group three received the face-to-face lecture plus slides in the lab and began lab work immediately. Group four received the face-to-face instruction plus slides in the classroom and began lab work after two days. The same instructor taught all four groups. Only portions of the ITV presentation were up to desired technical and instructional standards, and lectures were not equal in quality or time.

Students were scored on their laboratory performances. All students' lab performance products were put on a table with students' identification hidden to avoid criterion contamination.

A t test indicated that a significant decrease (.05 level) in retention of the television presentations had occurred during the delay between instruction and its application. No differences were found when achievement was compared between groups receiving instructions by television and illustrated lecture, despite a televised demonstration that was satisfactory for only some steps of the preparation. Students who receive satisfactory instruction by television which is applied immediately score higher in achievement than those who receive a satisfactory illustrated lecture which is not applied for several days.

Greenhill, L. P., J. J. Lottes and A. Pagano. Adaptation and evaluation of a programed mathematics course for televised presentation, Comparative Research on Methods and Media for Presenting Programed Courses in Mathematics and English, C. R. Carpenter and L. P. Greenhill, editors. USOE Grant Number 736116. University Park: The Pennsylvania State University, March, 1963. Pp. 29-38.

Problem: determine if a self-pacing programed textbook situation is as effective in learning as programed textbooks presented over television.

Sample: 63 students at Penn State.

Subject taught: algebra.

Key variables: learning from self-pacing with individual programed textbooks, and from programed textbooks presented over TV.

Sixty-three students were randomly assigned to two treatment groups. One group received the programed material by TV, proceeding as a group, and making overt responses on prepared answer sheets. The other group worked the programed material on individual teaching machines.

All students took the SCAT as a pretest. Students also took unit tests (K-R #20 r for unit tests summed = .94), a midterm (K-R #20 r = .70) and a final exam (K-R #20 r = .81).

Analyses of variance and covariance (where applicable) run on the summed unit test scores, midterm and final examinations all revealed no significant differences between the two groups on any of the three measurements.

Greenhill, Leslie and Malcolm McNiven. Relationship between learning and the perceived usefulness of a film. Audio-Visual Communication Review, 4 (1956), 255-267.

Problem: determine the relationship between subjects' perceived usefulness of a film and learning from it.

Sample: seniors in York, Pennsylvania high school.

Subjects taught: first aid, atomic energy, how a car functions.

Key variables: perceived usefulness, psychological goal distance, temporal goal distance, attitudes, and learning.

All subjects filled out a ranking sheet before viewing, estimating the usefulness of the films to them. Subjects then were randomly assigned to view one of the three films. In each viewing group, therefore, were students who had ranked the film first, second, or third. This served as the operational definition of psychological goal distance. One of these viewing groups was divided into three subgroups. One subgroup was told they would be expected to demonstrate their knowledge of first aid the next day, another subgroup was told they could expect a test in two months, and the last subgroup was given no special information. This was the operational definition of temporal goal distance. Subjects then took an information pretest on the content of their film. These tests were 39-item multiple choice, and had K-R #21 reliabilities from .67 to .86. Subjects then viewed the films, took a posttest content test, a 16-item Guttman attitude scale (coefficients of reproducibility ranged from .89 to .93) and an Otis IQ test.

Second order partial correlations between attitude scale scores of perceived usefulness and learning posttest scores were significant for two of the three main film groups (.01 level). Second order partial correlations between rankings and learning posttest scores were significant for all three groups. Correlations between rankings and attitude test scores were also significant.

Analysis of variance and covariance indicated no significant differences between the learning or attitude means of the temporal goal distance groups.

Greenhill, L. P., O. S. Rich, and C. R. Carpenter. The Educational Effectiveness, Acceptability and Feasibility of the Eidophor Large-Screen Television Projector. University Park: Division of Academic Research and Sciences, Pennsylvania State University, January, 1962. (See also Owen Sterling Rich. A study of comparative effectiveness and acceptance of Eidophor large-screen television for college instruction. Unpublished Doctor's dissertation, Pennsylvania State University, University Park, 1963.)

Problem: determine the relative effectiveness of large-screen and small-screen television on learning, and to determine students' attitudes.

Sample: See below.

Subjects taught: zoology, accounting, and economics.

Key variables: large- and small-screen ITV presentation; learning, attitude, and behavioral choice.

ACHIEVEMENT

Zoology

506 students were randomly divided into three groups. 213 students were assigned to 30-student classrooms with 24-inch receivers. 88 students were assigned to a large 400-student classroom with six 24-inch receivers. 205 students were assigned to an auditorium with a 1200-seat capacity with the Eidophor projector. The auditorium seats were upholstered, and students had to use lapboards. The Eidophor image was 14 x 11 feet and no student was located farther than six screen widths. In the classrooms no student was farther from a set than twelve screen widths. All students simultaneously saw two ITV lecture-demonstrations each week for a semester. Students took four course examinations. An r of .86 (Spearman-Brown split-half) was obtained for the final examination.

An analysis of covariance controlling on Moore-Castore scores was run on each of the four examination scores and indicated no significant differences among the three groups.

Accounting

55 of 223 students were randomly assigned to the large screen projection treatment and the remaining 168 students were assigned to 30-seat classrooms. Students simultaneously saw two ITV lectures a week. Students took four course examinations and a pop quiz. Reliability coefficients for some of the tests ranged from .75 to .86 (Spearman-Brown split-half).

Five analyses of covariance (run on each of the five test scores and controlling on Moore-Castore aptitude scores) indicated no significant differences between the two groups.

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ATTITUDE

Economics

170 students were randomly divided into two groups. One group was assigned to the auditorium and the Eidophor treatment for six weeks while the other group was assigned to various 30- and 40-seat classrooms. After six weeks the two groups changed places. Students were given a couple days of free choice and then asked to choose a permanent room. 106 (63.8 per cent) chose the Eidophor large-screen system and 60 (36.2 per cent) chose the regular ITV classrooms. A few days later students indicated reasons for their choice. The four reasons most frequently mentioned for choosing the auditorium (large screen) were: seats were more comfortable, the location was more convenient, it was easier to see, and the image was large. The four reasons most frequently mentioned for the small ITV classrooms were: the auditorium was conducive to sleep, it was easier to take notes on desks than on lapboards, the lighting was poorer in the auditorium, and the location of the classroom was more convenient.

Zoology

180 students were selected from 500 zoology students and divided into two groups, either the large screen or the large classroom with six 24-inch TV receivers. After six weeks the groups changed places. After 12 weeks students were asked to write which location they would prefer the remaining four weeks. 133 (77 per cent) chose the large screen and 40 (23 per cent) chose the large classroom with 24-inch receivers. Students were assigned to the location on the basis of overt preferences. Students were then given a questionnaire including a list of suggested factors that might have influenced their choice, and asked to respond to each one on a four-point scale. The most important factors were: TV screen easier to watch; TV screen size more desirable; blackboard, pictures, etc., easier to see; models and demonstrations easier to see; seats more desirable.

Accounting

Of the students who had taken accounting a full semester by the large screen, 89 per cent thought the picture quality was as good or better than regular TV receivers. 85 per cent indicated they would attend another large screen ITV course.

Gropper, George L. and Arthur A. Lumsdaine. An experimental comparison of a conventional TV lesson with a programmed TV lesson requiring active student response. Studies in Televised Instruction, Report No. 2. USOE Project Number 336. Pittsburgh: Metropolitan Pittsburgh Education Television Station WQED-WQEX and American Institute for Research, March, 1961. Audio-Visual Communication Review, 9 (1961), A-50-51. (Abstract)

Problem: determine the relative effectiveness of a conventional ITV lesson with a programed ITV lesson requiring active student response.

Sample: 140 (heat) and 158 (nuclear reaction) junior high school students around Pittsburgh.

Subjects taught: heat and nuclear reaction.

Key variables: programed and conventional ITV presentations; learning, retention, ability.

A lesson on heat and nuclear reaction were each presented on ITV by both conventional presentation and by programed presentation. The ITV teacher in the programed presentation paused to allow students time to write down their response. Also during the pause a question mark appeared on the screen. All students took an immediate and delayed (1 1/2-2 weeks) achievement test.

Analysis of variance indicated that for the lesson on heat, the programed ITV group had significantly higher scores than the conventional ITV group. High-ability students in the programed group had significantly higher scores than high-ability students in the conventional group for both immediate and delayed posttests. There were no significant differences in the scores of low-ability students between the two groups on the immediate posttest, but conventional students had significantly higher scores on the delayed posttest than the programed group. For the nuclear reaction lesson, two of the five comparisons made were significantly in favor of the programed group.

Gropper, George L. and Arthur A. Lumsdaine. An experimental evaluation of the contribution of sequencing, pretesting, and active student responses to the effectiveness of "Programmed" TV instruction. Studies in Televised Instruction, Report No. 3. USOE Project Number 336. Pittsburgh: Metropolitan Pittsburgh Educational Television Station WQED-WQEX and American Institute for Research, April, 1961. Audio-Visual Communication Review, 9 (1961), A-51-52. (Abstract)

Problem: determine the relative effectiveness of programed ITV made by sequencing, pretesting, and active student response.

Sample: between 150-186 junior high school Pennsylvania students from four schools.

Subjects taught: laws of motion, how movies work and levers.

Key variables: sequencing, pretesting and active student response; learning, retention.

Three experiments were done. For the first, an ITV lesson on laws of motion was shown in two versions. One group saw a conventional ITV version. The other group saw a version where the lecturer stopped and invited students to complete what he was going to say, and other active participation.

Analysis of variance indicated no significant differences between groups on immediate or delayed posttest scores.

For the second experiment, an ITV lesson on how movies work was shown in two versions. One group saw a version which required active response and the lecturer supplied the correct answer after the student response. The other group saw the same lesson, but without active participation.

Analysis of variance indicated that the active response students had significantly higher achievement scores on both the immediate and delayed posttests than the passive group.

For the third experiment, an ITV lesson on levers was shown in three versions. A preview programed version, a version revised after a tryout with three students, and a version twice revised. The latter two versions were compared.

_t_-tests indicated that students seeing the second version had significantly higher scores than those seeing the first, but there were no significant differences on retention scores.

Gropper, George L. and Arthur A. Lumsdaine. An investigation of the role of selected variables in programmed TV instruction. Studies in Televised Instruction, Report No. 4. USOE Project Number 336. Pittsburgh: Metropolitan Pittsburgh Educational Television Station WQED-WQEX and American Institute for Research, April, 1961. Audio-Visual Communication Review, 9 (1961), A-52-53. (Abstract)

Problem: determine the relative effectiveness of ITV with student competition, intermittent feedback of knowledge of results, active vs. reading responses, and active responses vs. listening.

Sample: 150-224 seventh- and eighth-grade students in four to six classes in Pennsylvania.

Subjects taught: airplanes, satellites, body chemistry, and chemistry.

Key variables: student competition, intermittent feedback, active, reading, and listening responses; learning.

Four experiments were prepared with programed (sequenced and pretested) lessons. For the first experiment, some students viewed a lesson on airplanes requiring active student responses and competition with instudio students, whereas control students merely viewed the lesson. For the second experiment, some students viewed a lesson on satellites requiring active response and received intermittent knowledge of correct results, whereas control students merely viewed the lesson. For the third experiment, some students viewed a lesson on body chemistry requiring the students to complete responses on a worksheet, whereas control students viewed the lesson having a completed worksheet before them, and the instructor read the sentences twice. For the fourth experiment, some students viewed a lesson on chemistry requiring active responses while a question mark appeared on the screen as the teacher paused, whereas control students viewed a version with no pause, but a triangle appeared on the screen at the same points.

Analysis of variance indicated no significant differences between scores of any of the groups on the four experiments.

Gropper, George L., Arthur A. Lumsdaine and Virginia Shipman. Improvement of televised instruction based on student responses to achievement tests. USOE Project Number 336. Pittsburgh: Metropolitan Pittsburgh Educational Television Station WQED-WQEX and American Institute for Research, March, 1961. Audio-Visual Communication Review, 9 (1961), A-48-49. (Abstract)

Problem: determine improvement in an ITV lesson by utilizing test results.

Sample: 30-40 junior high school students for each lesson.

Subjects taught: heat and introduction to chemistry.

Key variables: preview and revised lessons, learning.

Two lessons on heat and introduction to chemistry were shown to junior high school students. Students then took an achievement instrument. An analysis of the instrument was made to determine what points had been poorly learned, and the lecture was revised accordingly. Later, both the preview and revised versions were broadcast.

t-tests (using number of intact classes rather than number of students) indicated that students watching the revised version had significantly higher posttest scores than those watching the preview lesson. Students' scores on the demonstration parts of the revised lecture were significantly higher than students' scores of the demonstration parts of the preview lecture, but scores on the demonstration parts were generally lower than over-all scores.

The authors concluded that preview testing is a satisfactory substitute for classroom interaction between teacher and student.

Gropper, George L., et al. An evaluation of television procedures designed to stimulate extracurricular school activities. Studies in Televised Instruction, Report No. 6. USOE Project Number 336. Pittsburgh: Metropolitan Pittsburgh Educational Television Station WQED-WQEX and American Institute for Research, May, 1961. Audio-Visual Communication Review, 9 (1961), A-54-55. (Abstract)

Problem: determine the relative effectiveness of three procedures to motivate students to do certain experiments on their own.

Sample: seventh- and eighth-grade Pennsylvania students.

Subject taught: physical science experiment demonstrations.

Key variables: student and adult demonstrations; providing kits, postcards, or nothing; interest, performance.

The control group watched an adult demonstrator do the six physical science demonstrations, and the experimental group watched a student do the demonstrations. In the latter condition, three of the six demonstrations were completely done and three were only partially done. After the telecast students were asked which demonstration they would like to try at home. One-third were given a kit for the demonstration of their choice, one-third were given post cards to mail for their kit, and one-third were told if they mailed a post card (of their own) they would get a kit. All students filled in a pre- and post-science interest questionnaire, as well as a third questionnaire two weeks later (to see if they had done the demonstration or not).

Analysis of variance and chi-square indicated that girls watching the adult demonstrator had a significantly higher increase in science interest scores than girls watching the student (peer) demonstrator. There were no significant differences between boys for adult or student demonstrations. Significantly more students did the demonstration at home after seeing the student performance than the adult. Students receiving kits or post cards had a significantly higher increase in science interest; students not receiving post cards had no significant difference between pre- and posttest in science interest. Of those students receiving no kit, significantly more reported performing the demonstration at home after seeing the student demonstration than the adult.

Grosslight, J. H. and Charles J. McIntyre. Exploratory studies in the use of pictures and sound in teaching foreign language vocabulary. SDC 269-7-53. Instructional Film Research Reports. Port Washington, New York: U. S. Naval Special Devices Center, 1955.

See: Kale, Shrikrishna Vasudeo. Learning and retention of English-Russian vocabulary under different conditions of motion picture presentation. Unpublished doctoral dissertation. State College, Pennsylvania: The Pennsylvania State College, 1953. (Multilith)

Problem: determine the relative effectiveness in retention of English-Russian noun and verb pairs with different presentations.

Sample: 947 college students.

Subject taught: Russian language.

Key variables: words alone, words with still pictures, words with silent motion pictures, words with sound motion pictures, sound motion pictures with student participation, random order, serial presentation.

This is the combined report of a study by Kale (q.v.) and modification of procedure by present authors in a second study.

Students were taught Russian language by combinations of variables to determine most effective presentation. This study involved only the recognition of the Russian words, not their correct pronunciation.

Results.

1. Pictures plus titles v. Titles only. In first study motion pictures plus titles were significantly more effective than titles alone. There was no significant difference in learning between still pictures with titles and title alone. In second study both motion and still pictures with titles resulted in greater learning than titles alone. Having pictures with a word results in greater learning.

2. *Motion v. Still pictures*. No significant difference in learning from still or motion pictures. Study one intimated that motion pictures were particularly advantageous.

3. *Sound v. Silent*. Sound interfered with learning, at worst, and at best did not enhance it. Pronunciation was not related to spelling and therefore confused spelling.

4. *Participation v. No participation*. Participation in the form of pronouncing the Russian words as they were spelled inhibited learning. See #3 supra.

5. *Random v. Serial order*. Groups learning words in random order learned less than groups learning words in serial order. Suggested that serial group was learning by association with previous words in word lists. When tested for recall, the serial order group had forgotten more words, but had also remembered more words than random order group.

6. *Male v. Female*. Women learned more, forgot less, and relearned more than men. Differences were not always significant, but there were no reverses to this trend.

Conclusions. For teaching Russian vocabulary, it was recommended that use be made of visual aids in form of pictures, these pictures need not be motion pictures, a narrator pronouncing words when spelling words is the goal will inhibit learning, and films are a convenient method of repetitive presentation of new words.

Closed-circuit television: Teaching in Washington County 1958-1959.
Hagerstown: The Board of Education, March, 1959.

Problem: determine students' and teachers' attitudes to ITV.

Sample: see below.

Key variables: students' and teachers' attitudes, sociometric choice, discussion patterns; ITV and face-to-face presentation.

2567 students in grades 3 through 12 were chosen at random and given an anonymous 50-item questionnaire about their feelings toward ITV. The students accepted ITV. Only 5 per cent indicated they never had their questions answered. Eighty-seven per cent indicated that the follow-up discussion was of great benefit. Fifty-eight per cent of the students thought they learned more from ITV than from face-to-face presentations. Two-thirds of the students thought that an ITV course would be more interesting and that they would have to pay closer attention in a television classroom. Sixty per cent indicated they studied more for ITV classes. Students were about evenly divided on whether they talked with their parents more frequently, read more library books, or participated more in class discussions in ITV classes than in face-to-face classes.

Sixth- and eighth-grade ITV and face-to-face classes took a sociometric instrument. Analysis of ITV students' choices revealed fewer "isolates."

The number of comments made by sixth- and eighth-grade ITV and face-to-face students was counted, along with the type, frequency, and direction of participation.

Student participation in ITV classes seemed to be different from participation in face-to-face classes. Students responded to the ITV teacher and then projected or transferred their discussion to other students in the classroom.

520 families were interviewed about their reaction to ITV. Seventy-eight per cent of the parents were favorable to ITV, 54 per cent thought it would give children a better education, and 49 per cent preferred that their children take ITV lessons instead of face-to-face lessons (21 per cent gave no answer or didn't know). Business and industrial leaders were favorable to ITV.

Teachers responded favorably to ITV in an anonymous questionnaire. Eighty-three per cent indicated they would prefer to teach their present class with ITV, and thought ITV could improve the quality of instruction.

Gain scores on standardized tests of ITV students in various grades tended to be greater than gain scores of face-to-face students in the same grade.

Hall, Joe. Educational Television Project, Third Year, 1959-1960. Miami, Florida: Dade County (Greater Miami) Public Schools. July, 1960. NAEB Research Fact Sheet, Series I, 103, NAEB Journal, 21 (November 1962), 1-2 (Abstract).

Problem: comparative effectiveness of TV and face-to-face teaching.

Sample: 30,000 elementary and secondary school students.

Subjects taught: Spanish, art, music, science, literature, safety, history, civics, English, biology.

Key variables: TV teaching, face-to-face teaching.

The analysis of achievement tests when final test scores were adjusted relative to pretest performance indicates that there is no significant difference in results in the elementary schools or between the television method of instruction and face-to-face instruction in the secondary schools. Adjusted raw score differences favor face-to-face teaching in the elementary schools and are almost equally divided between TV and face-to-face taught groups in the secondary schools, but the differences were not statistically significant.

The author concludes that there is no loss in achievement of pupils through instruction by large-group televised instruction.

Handleman, Stanley D. A comparative study of teacher attitudes toward teaching by closed-circuit television. Unpublished Doctor's dissertation, New York University, New York, 1960.

Problem: compare attitudes of two groups of college teachers toward using television in college teaching.

Sample: 136 teachers from 24 colleges and universities representing major geographical sections.

Key variables: experience using television; attitudes.

Ten questionnaires were sent to each of forty colleges and universities having closed-circuit television. They were sent to the television coordinator of each school with directions for distribution and matching. Teachers were to be matched by age, sex, teaching experience, subject taught, and specific personality traits. Twenty-four schools returned the questionnaires. Each questionnaire was a forty-item Likert instrument concerning the use of closed-circuit instructional television.

Teachers who had taught by television had a significantly higher attitude toward ITV than had teachers who had not taught by television. A significantly positive relationship existed between length of time of television teaching and strength of positive attitude.

Seventeen of the forty statements used in the questionnaire differentiated the two groups. These included the fear of standardized mechanized education, fear of the non-television teacher decreasing in significance, lack of student feedback, and a distrust of measuring instruments used by researchers.

Harby, S. F. Evaluation of a procedure for using daylight projection film loops in teaching skills. Technical Report No. SDC 269-7-25. Port Washington, New York: Special Devices Center, 1952. Audio-Visual Communication Review, 1 (1953), 291-292. (Abstract)

Problem: determine the relative effectiveness of film loops with face-to-face demonstrations.

Sample: four physical education classes.

Subject taught: tumbling.

Key variables: filmed and face-to-face demonstration, films interspersed with practice and massed showings, and required viewing and free choice.

Two-minute sound films of each of eight tumbling demonstrations were prepared.

It was concluded that a filmed demonstration is at least as effective as a face-to-face demonstration, that demonstrations interspersed with practice might be more effective than massed showings, and regulated interspersion of movie demonstrations and practice might be more effective than the student having a choice to view or not. A fair level of proficiency can be taught with the films alone.

Hard, Gustav C. and Donald P. Watson. Testing scientific terminology on television. Science Education, 39 (1955), 140-141.

Problem: assimilation of subject matter in a given time in TV presentations.

Sample: three matched groups of randomly selected college students.

Subject taught: scientific terminology.

Key variables: learning, retention, number of terms presented.

Three matched groups of randomly selected college students viewed kinescopes of a TV lesson with varying numbers of scientific terms in each version. Version I had 15 scientific terms in 15 minutes, Version II had 20 terms in 19 minutes, and Version III had 25 terms in 24 minutes.

Students in each group saw only one version. After seeing the film, each group was asked to write down all the terms they could remember from the film, and then were given a comprehensive test of matching the terms with definitions.

Results. Using analysis of variance to interpret data, the authors found that (1) increasing the number of items in the specified time limits did not alter significantly the number of terms recalled or comprehended, (2) the group with the exposure to the most terms learned the most, but no study was made of the optimum number of scientific terms presented in a given time limit.

Hardaway, Charles W., C. Lawrence Beymer and William E. Engbretson. A study of attitudinal changes of teachers and pupils of various groups toward educational television. USOE Project Number 988. Terre Haute: Indiana State College, June, 1963. (Mimeographed)

Problem: determine attitudes of pupils and teachers toward ITV.

Sample: 1633 elementary pupils, 1487 secondary pupils, and 401 teachers in Indiana and Illinois.

Subjects taught: various MPTI courses.

Key variables: attitudes, attitudes over time, and ability level.

Three Likert attitude scales were constructed: an elementary, a secondary, and a teacher form. The three forms had 26, 34, and 42 items respectively. Judges determined that the scales had content validity in four areas: curricula content, instructional effectiveness, role of teacher, and role of the pupil. ITV course grade and IQ level were available for all pupils. The attitude scales were taken before and after a school year.

t-tests indicated no significant differences between elementary pupils' pre- and post-attitude scores. The combined third and fourth grades had a significantly higher attitude score than the fifth grade. Low-ability fourth-grade pupils had significantly higher attitude posttest scores than high-ability pupils, and high-ability fifth-graders had significantly higher attitude posttest scores than low-ability pupils. Fifth-grade pupils who received low grades had significantly higher scores than those receiving high grades. This finding was reversed for sixth-grade pupils. There were no significant differences between sexes on posttest means of any pupils.

Secondary level pupils had significantly lower posttest scores than pretest scores. Posttest mean scores of secondary pupils who had foreign languages by ITV were significantly higher than pupils having social studies, who in turn had significantly higher scores than pupils having secondary science. There were no significant differences between posttest mean scores of high- and low-ability secondary pupils.

There were no significant differences in attitude scores of elementary schoolteachers between pre- and posttests. Secondary schoolteachers shifted toward significantly lower attitude scores on the posttest. There were no significant differences between scores of teachers who utilized MPATI classes and those who didn't, but teachers who had utilized MPATI courses and had completed a course or workshop in MPATI utilization had significantly higher posttest scores than teachers who had not utilized MPATI courses and who had not attended a course or workshop. Teachers who were rated average or below by their respective administrators had more favorable attitudes toward educational television than did those teachers who were rated above average by their administrators.

Harris, Chester W. and Louise R. Buenger. Relation between learning by film and learning by lecture. Audio-Visual Communication Review, 3 (1955), 29-34.

Problem: determine the relation between learning by lecture and by film.

Sample: students in history at the University of Wisconsin.

Subject taught: history.

Key variables: lecture and film presentation, review of film, measurement of learning by objective and essay tests.

Students in classes (no random assignment) were given part of a unit on medieval history by lecture and part by two 10-minute British films. At the time of the six-weeks examination, students received a short, 15-item objective test (K-R #20 r = .63) on the special lecture unit, a short objective (K-R #20 r = .57) test on the film material, plus a traditional essay test (45 minutes). Correlation of the two objective tests with each other was .06, of the objective lecture test with the essay test .48, and of the objective film test with the essay test .12.

The authors then ran a second experiment, allowing students to review film material. Reliabilities of the two objective tests were about .36 (film) and .48 (lecture). Correlation of the film test with the lecture test was about .24, and correlation of the film test with the essay test was about .20.

From the explanations that could be offered, the authors felt that opportunity to review, which the lecture group had that the film group presumably did not have, might explain partly the observed differences.

Harris, Charles O., et al. Development of problem solving ability and learning of relevant-irrelevant information through film and TV versions of a strength of materials testing laboratory. USOE Grant Number 7-20-040-00. East Lansing: College of Engineering, Michigan State University, November 5, 1962. (Offset)

Problem: determine the relative effectiveness of learning from four presentation methods.

Sample: 150 students at Michigan State University.

Subject taught: Strength of Materials.

Key variables: kinescope, color film, color film and lab, lab only presentations; learning; relevant and irrelevant material.

Fourteen color films from 14 to 29 minutes long were especially produced on various topics. Students had either the conventional laboratory treatment, the lab and films, films only, or the films shown on TV (and rendered black and white) treatment. Students in all treatment conditions took 20-minute achievement tests after each film (or demonstration). Item analysis eliminated items answered correctly by fewer than 10 per cent or greater than 90 per cent of the students, and all items having an r_{bis} of $< .40$ with the total score.

A significant interaction was found for test scores on relevant material between groups and topics. The predicted hypothesis that mass communication media would be more effective by screening out irrelevant material was partially supported.

The second-year students took ten problem-solving questions (each question had an $r_{bis} > .57$ with the total score). Students in the film and lab group had significantly higher scores (.05 level) than film only or lab only groups. There was no significant difference between film only and lab only groups.

Hartman, Frank R. Filmed lectures as supplementary and refresher education. Audio-Visual Communication Review, 8 (1960), 214-219.

Problem: determine students' attitudes and learning from supplementary films.

Sample: 155 Penn State students.

Subject taught: Harvey White "Introductory Physics" mechanics and electricity and magnetism (E&M) films.

Key variables: mechanics and E&M films; learning, and attitudes.

Students were divided into two groups: one group saw E&M films and the other saw mechanics films from the Harvey White series. All students took the CEEB physics tests as a pretest. After the 11-week series, each group took a 50-item examination having two parts: one part on E&M and another on mechanics. After the examination all students took a questionnaire on the value of the films.

An analysis of covariance run on students' scores on the mechanics part of the final examination, controlling for CEEB physics pretest scores, indicated that the students viewing the mechanics films had significantly higher (.01 level) scores than the E&M students. An analysis of covariance run on students' scores on the E&M part of the examination, controlling for CEEB physics pretest scores, indicated that students viewing the E&M films had significantly higher scores (.01 level) than the mechanics students.

Students regarded the films as helpful in understanding physics, and 66 per cent indicated they would like to see Penn State University have a physics course "based on these films."

In another experiment, students attending engineering classes were invited to attend evening showings of the mechanics film series. About 10 per cent (n = 34) attended the first showing and about 5 per cent (n = 15) attended the second showing. Only three students attended the fifth viewing. Students who attended were neutral or slightly favorable toward the value of the films.

Hartman, Frank R. Investigations of recognition learning under multiple channel presentation and testing conditions. In Research on the communication process: A report covering the period September 1958-September 1960. University Park: The Pennsylvania State University, October, 1960. Pp. 5-1 to 5-26. (Offset)

Problem: determine the relative effectiveness of additional channels to increase learning, and the effectiveness of redundant information.

Sample: 1184 PSU freshmen.

Subject taught: a film having 5-second presentations of 25 people looking up and smiling while their name appeared on the screen and an announcer read the name.

Key variables: audio, print, pictorial, pictorial and audio, pictorial and print, audio and print, and audio and print and pictorial treatments and testing conditions; learning.

Students saw the film presented on television sets. Seven channel combinations were achieved by omitting the audio, omitting the video, or blocking out the filmed person, or blocking out the filmed person's name. After viewing (or hearing) the film, each group watched a film having 5-second presentations of 75 people and attempted to identify which 25 of the 75 they had watched previously. Students then filled out a questionnaire.

Experiment I

The following table shows the seven different ways the 25 person film was presented and three of the different ways the groups saw the 75 person testing film. The number indicates the number of subjects in that treatment.

	Audio	Print	Pict.	Audio & Print	Audio & Pict.	Print & Pict.	Audio & Print & Pict.
Audio	22	23	0	22	24	22	23
Print	23	23	0	23	23	22	25
Pictorial	0	0	22	0	22	22	22

Analyses of variance and t-tests indicated that for the groups tested by the audio channel, the audio and print group had significantly more correct discriminations than both the pictorial and print, and pictorial and audio groups (.05 and .01 levels); the pictorial and audio group also had significantly fewer correct discriminations than the audio, print, or audio and pictorial and print groups.

For the groups tested on the print channel, the group who had received the initial treatment by print had significantly higher discrimination scores than any other group except the print and audio group; the print and audio group in turn had significantly higher scores than all other groups, and the pictorial and audio group had significantly lower scores than any of the other groups.

For the groups tested on the pictorial channel, analyses of variance indicated no significant differences in discrimination scores for any of the (four) groups.

It was concluded that the addition of the pictorial channel resulted in fewer correct discriminations, and that interference occurred in the three channel presentation groups. The interference between names and faces was unexpected, and the author suggests that attention was divided and learning in both channels was reduced.

Experiment II

Additional students in each of the seven treatments (n about 34 in each treatment) were tested by an audio and print and pictorial combination.

Analysis of variance indicated significant (.01 level) differences among the means of the seven treatment groups. t-tests indicated that the audio and pictorial and print group had significantly higher discrimination scores than any other group except the audio and print group; the audio and print group in turn had significantly higher scores than any of the remaining groups except the print group, and the pictorial group had significantly lower scores (.01 level) than any of the groups.

The author concludes that in the audio and pictorial and print testing condition, the addition of the pictorial channel to the verbal channels produces an advantage over two of the verbal channels, audio and print, and audio, but not over print.

Experiment III

Additional students in each of the seven treatments (n about 30 in each treatment) were tested by (1) audio and print, (2) audio and pictorial, and (3) print and pictorial conditions.

Analyses of variance indicated significant (.01 level) differences among the means of the seven treatment groups for each of the three testing conditions.

For the groups tested on the audio and print channel, t-tests indicated that the audio and print group had significantly higher discrimination scores than any other group except the print group, and that both the print and the audio groups had significantly higher scores than both the audio and pictorial and print, and the audio and pictorial groups.

For the groups tested on the audio and pictorial channel, t-tests indicated that the pictorial group had significantly lower scores than any other group.

For the groups tested on the print and pictorial channel, t-tests indicated that the audio and print group had significantly higher scores than all other groups except the audio and pictorial and print group; the audio and pictorial and print group had significantly higher scores than the pictorial and audio, the audio, and the pictorial groups, and that the pictorial group had significantly lower scores than any other group.

Hayman, John Luther, Jr. A comparison of three presentation methods in educational television. Unpublished Doctor's dissertation, Stanford University, Stanford, 1961.

Problem: determine the relative effectiveness in learning Spanish on ITV by direct lecture, lecture plus student response, and lecture with a pupil panel plus student response.

Sample: 608 fifth-grade pupils from 24 Denver schools.

Subject taught: first-year Spanish (aural--oral; no reading or writing).

Key variables: direct lecture, direct lecture plus student response, lecture with a pupil panel in the studio plus student response, learning.

Two fifteen-minute telecasts were videotaped for each of the three presentation methods. In the direct lecture method, the teacher taught directly to the camera. In the lecture plus student response method, the teacher asked students to respond. In the third method the ITV teacher talked with and got a verbal response from some pupils in the studio, and classroom pupils were asked to respond also. All pupils received a twenty item (split-half r = .84) listening comprehension instrument administered on television. Eight of the items were specifically practiced during the lecture; twelve were not. A negatively skewed distribution necessitated using a transformation technique to obtain a normal curve (McCall's T scaling). IQ, grade average, and California Achievement scores in reading vocabulary and English mechanics were used as control variables.

Analysis of covariance showed a "significant" (.075 level) F ratio among students in the three presentation methods. Students receiving the pupils-in-studio-and-recitation method had significantly (.057 level) higher scores than those in the second method.

Group rank differences were significantly larger between groups receiving the second and third methods (.01 level) and tended to be larger (.12 level) between groups receiving the first and second methods. Scores on rehearsed items were significantly higher than on unrehearsed items for groups in all three presentations.

There were no significant interactions.

Hayman, John L. Jr. Viewer location and learning in instructional television. Audio-Visual Communication Review, 11 (1963), 27-31.

Problem: determine learning from ITV.

Sample: 577 fourth-grade pupils from 24 Denver schools.

Subject taught: Spanish.

Key variables: pronunciation, learning, location in viewing room.

All pupils saw three 15-minute ITV lessons and took a 35-item listening comprehension test after the third lesson. The average biserial correlation of items with the total score was .40 and split half r = .72. The second test was a speaking test involving repeating words heard and oral identification of articles in Spanish. Seventy pupils took the second test.

Analyses of covariance were run controlling on IQ, grade point average, and Stanford Achievement Test paragraph meaning scores. There were no significant differences on the test of listening comprehension among scores of pupils sitting in the center portion, the far back portion, or the sides of the viewing room. On the speaking test, pupils in the center and in the back made significantly higher scores (.05 level) than pupils in the sides. Those on the sides were at an angle of more than 40 degrees from the center of the TV screen.

Hayman, John L., Jr. The Denver-Stanford project -- increasing ITV's effectiveness through contextual activities. Paper presented at the conference on The Improvement of Teaching by Television and Radio, University of Missouri, Columbia, March 2, 1964. (Typewritten) See also Andrade, Manuel, John L. Hayman, Jr., and James T. Johnson, Jr. Measurement of listening comprehension in elementary-school Spanish instruction. The Elementary School Journal, 45 (1963), 84-93; Barcus, Delbert, John L. Hayman, Jr., and James T. Johnson, Jr. Programing instruction in elementary Spanish. Phi Delta Kappan, 44 (1963), 269-272; Hayman, John L., Jr. and James T. Johnson, Jr. Exact vs. varied repetition in educational television. Audio-Visual Communication Review, 11 (1963), 96-103; Hayman, John L., Jr. and James T. Johnson, Jr. Parents help educate their children through instructional television. The Journal of Experimental Education, 32 (1963), 175-180; Hayman, John L., Jr. and James T. Johnson, Jr. Research on the context of instructional television. School Life, 45 (1963), 8-11; and Hayman, John L., Jr. Viewer location and learning in instructional television. Audio-Visual Communication Review, 11 (1963), 27-31.

Problem: determine the relative effectiveness of combinations of ITV with different types of classroom and home activities.

Sample: 13,000 Denver fifth- and sixth-graders in 90 schools.

Subject taught: Spanish.

Key variables: frequency of instruction by television; face-to-face and programed instruction; electronic aids (tape recorders), home practice, teacher interest and motivation, and pupils' learning.

Fifth-grade pupils watched 15-minute ITV lessons three times a week, and sixth-grade pupils watched 15-minute ITV lessons twice a week. All pupils had a 15-minute face-to-face follow-up after each ITV lesson. Sixth-graders had an additional 30 minutes of face-to-face instruction (not preceded by ITV) each week. Fifth-grade instruction involved only listening and speaking; this audio-lingual instruction continued for the sixth grade, and reading and writing were introduced.

The first year of research involved only fifth-grade pupils. One group watched television only, other groups had different types of additional instruction, and a final group watched each ITV lesson twice.

The second year of research, fifth-grade pupils listened to records or tape recorders. Sixth-graders were divided into two groups: each watched the two ITV lessons a week, but one group had reading and writing instruction introduced the first semester whereas the other group had reading and writing introduced the second semester. Pupils had reading and writing either by face-to-face or programed instruction methods.

The third year, fifth-graders were divided into three groups: without additional electronic aids, electronic aids without feedback, and with feedback (could record and play back their own voices). Reading and writing combinations included teacher-directed instruction plus programed instruction in school, teacher-directed instruction in school and programed instruction at home, and these methods plus extended reading at home and at school.

Analysis of covariance was the primary statistical technique used.

Following are some of the major conclusions of the study. A second viewing was valuable when the pupils had no additional instruction; when other instruction was provided, the second viewing was less effective. Classroom practice consisting of structure, dialogue, and narrative drills proved most effective. Electronic aids, especially those with feedback, were most effective, notably when teachers had moderate experience and preparation. Reading and writing should start at least by the beginning of the second year of instruction. Supplemental activities which provided more variety produced more learning. A well-trained and motivated classroom teacher was the most effective single learning aid. Both the interest and experience of the classroom teacher influenced learning. Where teacher interest was high, pupil performance was directly related to teacher preparation and experience. Where teacher interest was low, pupil performance was inversely related to teacher preparation and experience. If not begun too early, programed instruction was as effective as face-to-face teaching; a combination of programed instruction and face-to-face instruction was still more effective. Children whose parents participated in the program learned more Spanish than those whose parents did not participate. There was a low correlation between amount of practice at home and pupil performance. There was a higher correlation between performance and the number of weeks participation continued.

Hayman, John L., Jr. and James T. Johnson, Jr. Exact vs. varied repetition in educational television. Audio-Visual Communication Review, 11 (1963), 96-103.

Problem: determine learning by a second viewing of ITV.

Sample: 6000 pupils in 192 Denver schools.

Subject taught: Spanish.

Key variables: number of viewings per lesson, kinds and mode of repetition, learning, speaking, and teacher training.

In the first semester, all pupils were divided into three groups. All received Spanish by television. The second group received in addition a 15-minute teacher-directed follow-up. The third group did not have the follow-up but saw the program again that evening.

In the second semester, the ITV-only group's treatment changed so that they got both the follow-up and the second viewing. The second viewing constituted the exact repetition and the teacher-directed follow-up constituted the varied repetition condition.

Pupils tock a listening comprehension test (split-half r = .89) and an oral test.

Analysis of covariance technique controlled for IQ, grade point average, and Stanford Achievement Test paragraph meaning scores. Listening comprehension scores of first semester pupils in the teacher-directed follow-up group were significantly higher than those pupils seeing each program twice, which in turn were significantly higher than those of pupils in the non-repetition group (.001 level). Listening comprehension scores of second semester pupils in the teacher-directed group were significantly higher than those of pupils seeing each program twice (.01 level), but there were no significant differences between the teacher-directed group and the second viewing plus teacher-directed group.

A similar experiment was run the following year, in which pupils were assigned either to an ITV plus teacher-directed follow-up or to an ITV plus teacher-directed follow-up plus evening viewing treatment. The evening viewing group achieved significantly higher scores (.02 level) on the oral test than the comparable group without evening viewing. Exact repetition was most effective (as determined by listening comprehension test scores) for teachers with low training and was least effective for teachers with greater training.

Head, Sydney W. and C. Lee Philips. A field experiment in the summertime use of open-circuit television instruction to bridge the gap between high school and college. [USOE Grant Number not given.] Coral Gables, Florida: University of Miami, 1961. (Mimeographed)

Problem: determine the effectiveness of learning by television and students' attitudes toward television.

Sample: 66 students.

Subjects taught: English, logic and history.

Key variables: television and face-to-face presentation; learning and attitude.

Thirty-one students took all three ITV courses, 21 took two and 14 took one ITV course. The 66, as well as a control group of 362, took parallel forms of subject matter tests as pre- and posttests. Students taking history and logic by ITV had significantly higher scores on the ACE than control group students in those classes. Thus, these groups were not equated in ability.

Analysis of covariance, controlling for ACE scores on the pretest showed that for all three classes, television students made significantly higher test scores than did face-to-face students on the subject matter test.

Interviews with students after the second semester indicated that students regarded the summer courses as valuable. Students reported they could see and hear better, for television classes. They reported being less inhibited or distracted than in a large face-to-face class. Students did not believe that lack of "personal contact" was detrimental to learning. "Student-teacher contact seemed to be regarded as personally desirable but not essential to the educational objectives of the courses."

Herminghaus, Earl G. Large group instruction by television: An Experiment. School Review, 65 (1957), 119-133. Also see: An investigation in television teaching. Audio-Visual Communication Review, 5 (1957), 556. (Abstract)

Problem: comparative effectiveness of television and face-to-face teaching.

Sample: about 1000 ninth-grade students.

Subjects taught: general science, English composition.

Key variables: learning, TV teaching, face-to-face teaching, student attitudes.

Students in two high schools were taught subjects by open-circuit television and face-to-face instruction. Students were matched prior to instruction on intelligence, age, and socio-economic status of father. Achievement test was given as pretest in February before instruction and as posttest in June after instruction. The scores for the students on all matching variables and criteria were:

Test	TV taught	face-to-face taught	p
Greene-Stapp Language abilities test			
Pretest percentile	59	62	nsd
Posttest percentile	78	73	nsd
General Vocabulary (Iowa Test)			
Pretest percentile	66	65	nsd
Posttest percentile	79	73	nsd
Student Compositions			
First (judge's rating)	2.76	2.98	.01
Final (judge's rating)	3.08	3.19	nsd
Read General Science Test			
Pretest percentile	18	17	nsd
Posttest percentile	41	34	.05
Interpreting Reading Materials in Natural Sciences (Iowa Test)			
Pretest percentile	49	49	nsd
Posttest percentile	65	65	nsd

2--Herminghaus, Earl G.

There was a significant difference noted for the general science students with respect to intelligence and age that favored the TV group for intelligence and the face-to-face group for age. The authors reported after adjustment for initial ability, age, and socio-economic status that (1) there was no significant difference between methods of instruction for learning in English composition, and (2) there was no significant difference between methods of instruction for learning in general science.

Students, on the whole, did not react favorably to TV teaching as evidenced by an attitude inventory conducted near the end of the experiment. Two-thirds of the English students and half of the science students taught by TV thought they would have learned more in the face-to-face situation. They also reported they felt the TV instruction was less interesting and they missed personal contact with the teacher. The author concluded that students, by the ninth grade, have come to expect face-to-face contact with a teacher in the instructional situation and felt insecure in the TV teaching situation.

Himmler, Merwin Lewis. An analysis and evaluation of a television demonstration of the teaching of fifth-grade reading, arithmetic, and French. Unpublished Doctor's dissertation, University of Pittsburgh, 1957.

Problem: determine pupils' learning from ITV, and teachers' attitudes toward ITV.

Sample: 1351 fifth-grade pupils in 39 classes from the Pittsburgh area.

Subjects taught: reading, arithmetic, and French.

Key variables: television and face-to-face presentation; learning and attitudes.

Twenty classes daily received twenty-five minute ITV lessons in arithmetic and reading, and twenty-minute ITV lessons in French. After the televised portion, the reading classes had twenty-five minutes of face-to-face instruction, the arithmetic classes had fifteen, and the French classes had ten minutes of face-to-face instruction. Nineteen other classes served as a control group for reading and arithmetic. All pupils took standardized tests in reading, language skills, work-study skills and arithmetic the third week and at the end of the term. Pupils also took an intelligence test near the beginning and a teacher-made French test at the end of the term. Finally, pupils and teachers filled out questionnaires.

Achievement was compared by matching pairs. From 655 ITV pupils and 666 non-ITV pupils, 343 matched pairs were selected for reading, 349 were selected for arithmetic, 139 pairs for language skills, and 161 pairs for work-study skills comparisons.

There were no significant differences in scores of pupils in the ITV and non-ITV groups on the standardized tests. It was concluded that pupil interest will likely be high if the lessons have variety, if they are appropriately paced, and if they allow for student participation. Many teachers emphasized the importance of the supplementary sessions following the ITV lessons, and were not favorable to having regular ITV lessons. Reading was considered more suitable than French or arithmetic for ITV teaching.

Hirsch, Richard S. The effect of knowledge of results on learning of meaningful material, Abstracts of Dissertations, Vol. 27. Stanford, California: Stanford University, 1953. Pp. 31-33.

Problem: determine if knowledge of results affects retention of material learned from tests based on the contents of selected sound films.

Sample: 138 men in six groups of 23.

Subject taught: naval training.

Key variables: learning under various conditions: (1) correct answer rewarded with a lighted lamp, (2) the number of the correct answer appearing, (3) the question plus the right answer appearing on the screen, (4) film reshown with the question and correct answer, (5) test taken after the film without knowledge of the results, (6) film reshown after the test was taken (without knowledge of the results).

All subjects took a pretest over the content of the six films. Several days later, subjects saw the films, took a test immediately after the film, and learned (or did not learn) of their test results by one of the six methods indicated above. Each group saw all the films under all of the experimental conditions (knowledge of test results). Finally, all subjects took a delayed posttest on all the films.

Analysis of variance and t-tests indicated that the most effective method -- and significantly so -- was repeating the question and its answer, and, after the test, showing the film a second time (number 4 above). A repeat screening not only decreased forgetting but also made possible new learning. The second most effective method was repeating the question and its answer (but not showing the film a second time). These two methods had no significant loss in retention scores over the time tested. The third most effective method was showing the film twice but without knowledge of results. A significant amount of forgetting occurred with this method. Methods ranking fourth and fifth were the indication of response correctness by a lamp or answer number, and least effective was the method offering no knowledge of results.

Additional sources:

Hirsch, Richard S. "Effects of Knowledge of Test Results on the Learning of Meaningful Material." (Unpublished Doctoral dissertation, Stanford University, 1951).

Also found in:

Instructional Film Research Reports, Technical Report SDC-269-7-30 (Port Washington, N. Y.: U. S. Naval Special Devices Center) 1952.

Homman, Guy Burger. A study of several factors and their relationships to achievement in high school chemistry by use of factorial design and covariance. Unpublished Doctor's Dissertation, University of Kansas, Lawrence, 1961.

Problem: determine the relative effectiveness of film and non-film instruction on achievement.

Sample: 590 high school students.

Subject taught: chemistry.

Key variables: film and face-to-face presentation; sex, science or non-science career goals, and learning.

All students took the Anderson Chemistry Test and the ACS-NSTA Cooperative Examination as pretests and posttests, as well as the SCAT.

Eleven of the 20 hypotheses tested indicated that non-film students' achievement scores were significantly higher (.05 and .01 levels) than were film students'. The other nine hypotheses indicated no significant differences. There was a significant interaction between sex and method in two of the five analyses (.05 level). Neither previous science nor mathematics preparation was a significant factor in achievement scores.

Howe, Harold B. and George W. Boguslavsky. The development of animated films to facilitate creative space perception. USOE Project Number 259. Troy, New York: Rensselaer Polytechnic Institute, December 1961.

Problem: determine relative effectiveness of three methods of teaching descriptive geometry to engineering students, using different pictorial aids.

Sample: 536 freshman engineering students at Rensselaer.

Subject taught: descriptive geometry.

Key variables: multi-view projection, multi-view projection plus picture, multi-view projection plus picture plus six animated films; learning and attitudes.

Students were divided into three groups. Group one had a text with few pictorial illustrations and had a 50-minute lecture with no accompanying pictorial illustrations. Students were not required to supply pictorial representations as aids in solving problems. Groups two and three had a text which emphasized pictorial forms in space and students were required to use pictorial representations as aids in solving problems. The 50-minute lecture of group two used pictures; the 50-minute lecture of group three used six 20-minute films with each film shown on two different days, and the lecture on film days was only thirty minutes. Questionnaires indicated that a large number of students also referred to additional texts other than those assigned for their group. (Treatment I - 53%; Treatment II - 18%; Treatment III - 11%).

Treatment effects were measured by daily laboratory problems, selected from separate workbooks, with several in course similar tests and a final examination.

Chi square and the median test revealed no significant differences among groups. The relation of course performance and ability was closer in group three than the other two groups. Students preferred the text with pictures but preferred the method of lecture and grading of group one.

Hudson, W. Colour versus monochrome in a demonstration film used to administer performance tests for the classification of African workers. Journal of National Institute of Personnel Research, Johannesburg, South Africa, 7 (1958) 128. In Psychological Abstracts, 33 (1959) 9432. (Abstract)

Problem: comparative effectiveness of color and black and white films.

Sample: 147 African natives.

Subject taught: not given.

Key variables: learning, color film, black and white film.

A film was used to give instructions to African workers. One hundred forty-seven Africans representing 10 tribes were studied over a four-month period using both versions of the films. "Hypothesis that a colour demonstration film improves test instructions and consequently improves performance is rejected."

Huffman, Stanley Ausburn. A comparative analysis of four instructional methods in eighth grade science. Unpublished Doctor's dissertation, University of Virginia, Charlottesville, 1958.

Problem: determine the relative effectiveness of film, lecture, and demonstration combinations.

Sample: eighth-grade science students.

Subject taught: exploratory science.

Key variables: learning; lecture-description, lecture-film, lecture-demonstration, and lecture-film-demonstration.

Students were randomly assigned to one of the four treatments, and were taught for 4 weeks. Students took a pretest, a posttest, and a delayed posttest 4 weeks after the unit was finished.

t-tests indicated no significant differences between any of the treatment groups for any of the 3 testings.

Hunt, Lyman C., Jr. An experimental project appraising the effectiveness of a program series on reading instruction using open-circuit television. USOE Project Number 309. University Park: Pennsylvania State University, March, 1961. Audio-Visual Communication Review, 9 (1961), A-47. (Abstract)

Problem: determine the effectiveness of a television series designed to influence teachers in reading instruction.

Sample: 213 teachers of grades 1-6 in Pennsylvania.

Subject taught: individual reading instruction.

Key variables: ITV presentation or none, written reports, and attitudes of teachers, parents, and pupils.

Teachers were divided into four groups. Two groups agreed to watch as many of the 15 half-hour reading instruction programs as they could; two groups agreed not to watch them. One of the groups in each set of two turned in a written report each week. Teachers completed an attitude questionnaire and a self-report of teaching reading before and after the ITV series. Teachers were also observed and interviewed before and after the series. Some parents also took the attitude questionnaire. Pupils in grades 3, 4, and 5 also took an attitude test.

It was concluded that watching an ITV program of reading instruction significantly affected the observed classroom performance of teachers, and had a significant positive effect on changing teachers' attitudes toward teaching reading. Watching the program had a significant effect on what teachers reported they did and significantly changed attitudes of viewing parents, but had no effect on pupils' reading achievement or attitudes. Writing weekly reports had no significant effect on any of the other variables.

Hurst, Paul M., Jr. Learning sets: Kinescope vs. film. Audio-Visual Communication Review, 3 (1955), 257-273.

Problem: determine if trainees will learn more from a film if told it is a kinescope, or more from a kinescope if told it is a film.

Sample: 931 men at Bainbridge Naval Training Center.

Key variables: film and kinescope presentation, calling film kinescope or vice versa, learning.

Three films and three kinescopes were selected. Two groups viewed each film and kinescope. One viewing group was correctly told it was a film (or kinescope); the other group was incorrectly told it was a kinescope (or film). Each film-kinescope group was matched on number of weeks in training and Navy general classification test scores. Trainees were given a content objective test on each film or kinescope (r varied from .69 to .99 for the six film-kinescopes).

There were no significant differences between the scores of men who were correctly told the presentation medium from the scores of those who were incorrectly told the presentation medium.

Hurst, P. M. Jr. Relative Effectiveness of Verbal Introductions to Kinescope Recordings and Training Films (20-TV-2). Instructional TV Research Reports. Port Washington, New York: U. S. Naval Training Devices Center, 1955.

Problem: replication of 1951 study by Jackson to see if introducing a film as a kinescope recording increased learning.

Sample: 931 recruits at Bainbridge Naval Training Center.

Subjects taught: Atomic Defense, Manila and Wire Rope, Survival at Sea, Measuring Instruments.

Key variables: learning from films and kinescopes with varied introductions.

The same films and kinescopes used by Jackson in Learning from Kinescopes and Films (q.v.) were supplemented by two additional kinescopes and two more films. Six pairs of matched groups, matched on weeks of training and Navy General Classification Test scores, viewed the film. For each of the six kinescopes or films, one of a pair of matched groups received introductory remarks which stated they were to see a kinescope while the other group in the pair received an introduction stating they were going to see a film. Jackson's true-false pretests and posttests were used for the original devices and new multiple-choice examinations were constructed for the new devices. All tests were given in a pretest posttest design.

No significant differences in learning were found when the test scores for each of the pairs were analyzed by analysis of covariance adjusting for score on the NGCT. The study of two of the materials was repeated because of a possible significant difference in one and the wide variance with the results of the Jackson study in the other. In one of the materials no significant difference was found, but in the other the difference reached the .05 level, but in an opposite direction (favored film introduced as film) from Jackson.

The author concludes (1) substantial learning took place from both films and kinescopes, (2) there is no significant difference in learning when film is introduced as a kinescope or a kinescope introduced as films, (3) instructional effectiveness was not compared because of different contents of the six kinescopes and films, (4) the novel effect noted in Jackson may have disappeared in the intervening time period.

Husband, Richard Wellington. TV vs. classroom for learning general psychology. American Psychologist, 9 (1954), 181-83.

Problem: comparative effectiveness of TV and face-to-face teaching.

Sample: 54 college students at their homes.

Subject taught: General Psychology.

Key variables: TV at home, TV in studio, TV recordings (kinescope), face-to-face methods of instruction, learning.

Students were taught General Psychology by: TV at home where they viewed lectures broadcast over open-circuit TV, In-Studio Class seated either in studio with TV teacher while TV lesson was presented or in adjacent room watching monitor, Kinescope recordings viewed as films followed by a face-to-face discussion, or in two face-to-face classes taught by the TV instructor.

Student learning was measured by grades earned in the course with equivalence of groups controlled by high school grade-point average and ACE median test scores. The results were:

Class	Mean Grade* in Psychology Course	Mean High School Grade Point*	ACE Test Median (percentile)
TV-at-home	2.32	2.71**	na
TV-in-studio	2.06	2.85	52
Kinescope	2.50	2.81	52
Face-to-face #1	2.30	2.78	53
Face-to-face #2	2.24	2.89	58

*A = 4.000

**High school grades not available for 14 students.

na: not available.

(Article includes a description of the administration of the course.)

For follow-up study see:

Benschoter, Reba Patterson and Don C. Charles. Retention of Classroom and Television Learning. Journal of Applied Psychology, 41 (1957), 253-56.

Hussein, Hamdy Eltobgy. Survey of opinions of faculty members in the teachers colleges in Egypt regarding the potential use of television in education. Unpublished Doctor's dissertation, Indiana University, Bloomington, 1962.

Problem: determine teachers' attitudes toward ITV.

Sample: 120 teachers in Egypt.

Key variable: teacher experience with ITV; attitude.

One hundred and twenty or 66 per cent of the questionnaires which were mailed out were returned. A Chi square test between observed and expected frequency of answers determined significance.

ITV was accepted as a college teaching tool as supplementary only. Teachers having more experience with ITV were more favorable. Costs and lack of student-teacher relations were main reasons for disapproval. Teachers hoped that ITV would motivate students to learn more. Faculty members believed ITV teaching would increase prestige, but thought that using it should be optional.

Insel, Shepard A., Kurt Schlesinger and Wilfred Desrosiers. Dependency Responses to Televised Instruction. Journal of Applied Psychology, 47 (1963), 328-331.

Problem: comparison of self-dependent and other-dependent attitudes of students taught by television and lecture-discussion methods of instruction.

Sample: 375 college freshmen.

Subjects taught: biology, psychology, basic communication, and creative arts.

Key variables: self-dependent and other-dependent student attitudes toward effective and ineffective instruction, television teaching, lecture-discussion teaching.

Three hundred and seventy-five college freshmen were taught one of the four courses by television during a semester in which the remainder of their instruction was by lecture-discussion methods. After the tenth telecast each student was asked to describe specific and recent incidents which exemplified to them: effective and ineffective television instruction, effective and ineffective classroom instruction. Each student responded with an anecdote illustrating each of the four situations.

Four clinical judges examined each of the anecdotes and extracted the critical phrase or phrases from each one according to the Flanagan critical incident technique. These incidents were classed in six sub-categories of: teacher-initiated behavior, student-initiated behavior, student-teacher interaction, class discussion or interaction, application of course material or method, physical aspects of the teaching-learning situation. A seventh category of useless was added to collect unclassifiable statements.

After the incidents had been sub-categorized, they were classified as belonging to one of two logical groups of self-dependent and other-dependent incidents. Responses for the sub-category student-teacher interaction were removed from this classification to prevent biasing in favor of the lecture-discussion method.

Results. One hundred thirty-five students (35 per cent) responded to effective televised instruction in an other-dependent manner, while at the same time, describing effective lecture-discussion instruction in self-dependent terms. This percentage gave a chi-square of 90.44 with 9 degrees of freedom which was significant beyond the .001 level. There were no other significant combinations of effective-ineffective instruction incidents for television and lecture-discussion teaching.

Conclusions. Televised instruction evoked, or was related to, significantly more other-dependent responses than lecture-discussion instruction. The reporting of what is effective and ineffective in a teaching-learning situation in which there is little opportunity for student to teacher communication requires that students identify with external factors within a framework of value in order to derive meaning from the situation.

The authors note the frequency with which other-dependent responses occurred in lecture-discussion teaching situations and state that this may signal a shift in our educational structure to other-dependent attitudes as satisfying and meaningful instead of the individual-dependent attitude usually ascribed to the conventional classroom teaching-learning situation.

Instructional Film Research Program. Evaluation of the Film: Military Police Support in Emergencies (Riot Control) TF19-1701 SDC-269-7-52. Instructional Film Research Reports. Port Washington, New York: U. S. Naval Special Devices Center. 1954.

Problem: Does a filmic treatment of illusionistic representationalism increase learning from an instructional film?

Sample: three companies of military police trainees.

Subject taught: riot control.

Key variables: learning from illusionistic representational film, learning from filmograph without motion, learning from stock shot filmograph, AGCT scores, attitude toward riot control duty.

The hypothesis to be investigated was that more learning would take place from a film showing actual riot scenes than from a film without motion or using stock shots from a library of general crowd scenes. A film (TF19-1701) was prepared showing staged riot scenes filmed on location in several places of a large city. From this film, a filmograph (a filmograph is a series of "frozen frame" pictures on 16mm film with accompanying sound track narration) was produced from frames of the staged crowd scenes. The same sound track was used as in the original film. A second filmograph was produced using stock shots of crowds from a picture library instead of the staged crowds. The same sound track was used for this filmograph.

Two tests were constructed to evaluate the effectiveness of three films. The first test as a 52-item multiple-choice test designed to measure the factual information of the film. The second test was a 20-item attitude inventory used to measure differential effects of the films on attitude of trainees toward riot control training and duty. The information test was pretested on a company of recruits prior to the experiment. Using split half reliability test with Spearman-Brown prophecy formula correction, the coefficient of reliability for recruits who saw the film was .82 and 174 for recruits who did not see the film. Pretest information showed that learning could take place from seeing the original film. The difference between adjusted mean scores of trainees who saw the film and took the test and trainees who did not see the film but took the test was significant beyond the .0001 level.

The three film versions were then shown to three groups of recruits. The information test was then given to each group plus a group of recruits who did not see the film. The results were:

GROUP	ADJUSTED MEAN SCORE
Original Picture	28.34
Stage Group Filmograph	26.57
Stock Shot Filmograph	26.59
No Film	20.50

The comparison of the scores of those who saw the original film and the stage group filmograph showed a non-significant difference in favor of the original film group.

The responses for the attitude inventory toward riot control duty did not differ among any of the groups that saw any of the films, but there was a significant difference between all three film groups and the group which did not see the film. The groups which saw films responded more like the information shown in the film than the nonfilm group did.

Conclusions. (1) Each of the films taught a significant amount of material. (2) The original film taught slightly more information than the filmograph versions, but not significantly more. (3) All three versions were equally effective in changing attitudes toward riot control duty.

The implication is made in the study that the added expenses of creating an illusion of reality is not necessary for effective teaching of riot control.

Irwin, J. V. and A. E. Aronson. Television Teaching: Conventional Lecture Versus Highly Visualized Film Presentations. Madison, Wisconsin: University of Wisconsin TV Laboratory Bulletin No. 11, 1958. NAEB Research Fact Sheet, Series I, 62, NAEB Journal, 18 (March 1962), 1-4. (Abstract)

Problem: comparative effectiveness of teaching hearing techniques by face-to-face and film demonstration instructional methods.

Sample: not available.

Subject taught: hearing testing techniques.

Key variables: face-to-face, TV teaching.

In Fall 1958 students in Speech 25, Correction of Speech Disorders, were taught hearing testing techniques by two methods of instruction: film demonstrations and face-to-face instruction. The effectiveness of both techniques was evaluated by testing both the studio and monitor groups using two kinds of examinations, an objective verbal exam and a filmed situational type exam.

Authors report it was thought that previous failures of research to show statistically significant differences in the two modes of teaching was due to utilization of only a verbal examination. A second purpose of this experiment was to demonstrate any differences between the studio and monitor groups.

It was concluded from the results that (1) students made higher examination grades after verbal teaching when tested verbally and after demonstration teaching when tested with a filmed situational examination; (2) there was no statistically significant difference between TV and face-to-face taught groups.

Ivey, Sara M. and Norman DeMarco. A study of closed-circuit television as a teaching technique for speech improvement in the public school system. USOE Project Number 278. Fayetteville, Arkansas: Department of Speech and Dramatic Art, University of Arkansas, January, 1961. (Mimeographed)

Problem: determine the effectiveness of ITV as inservice training and the speech improvement of pupils.

Sample: 220 third-grade pupils from ten classes.

Subject taught: oral communication.

Key variables: learning; ITV presentation.

Pupils were divided into two groups. One group had 52 20-minute ITV lessons on oral communication; the control group had no speech improvement. The 20-minute ITV lessons used AV materials and dramatizations.

Pupils took the following tests: the Bryngelson and Glaspey Picture Articulation Test, an articulation test, SRA Language Comprehension tests, Audiovox Audiometric Test, a critical listening test, a sociogram, the K-A Intelligence Test, an auditory memory span test, and a speech sound discrimination test. Teachers took a 45-item program content test.

Analysis of covariance and _t_-tests indicated no significant differences on posttest scores between the two groups. A _t_-test indicated no significant differences between the scores of the experimental (n = 5) or control (n = 5) teachers on the program content test.

Jackson, Robert. Learning from kinescopes and films. SDC-20-TV-1. Instructional TV Research Reports. Port Washington, Long Island, New York: U. S. Naval Special Devices Center, 1952.

Problem: Do introductory descriptions of kinescope as TV recordings increase learning?

Sample: 240 airmen.

Subject taught: Atomic Defense.

Key variables: learning from kinescope and films under different introductory descriptions. (See below.)

Four pairs of groups of 30 airmen each were matched on basis of age, rank, classification scores, and years of schooling. They were shown a kinescope or a film about Atomic Defense under different conditions of description about the film or kinescope. Learning from these devices was estimated by administering a 100-item true-false test. One test was based on the kinescope's content, the other on the film content. Tests were pretested and standardized by scores of undergraduate college students in the New York metropolitan area. Each test was given as a pretest and a posttest and corrected for chance by subtracting the wrong answers from the right answers. Final scores were determined by subtracting the corrected before scores from the corrected after scores. The four groups saw films or kinescopes and scored on the examinations as follows:

GROUP	SAW	TOLD SEEING	SCORED	CONFIDENCE LEVEL OF DIFFERENCE
1A	Kinescope	Kinescope	36	.01
1B	Kinescope	Film	28	
2A	B&W Film	Kinescope	40	.01
2B	B&W Film	Film	26	
3A	B&W Film	Kinescope	40	.01
3B	Color Film	Film	25	
4A	Color Film	Kinescope	40	.30
4B	B&W Film	Kinescope	34	

2--Jackson, Robert

The author concluded that students learned significantly more from viewing black and white and color films when they were introduced as kinescope recordings rather than direct films. Students also learned significantly more from viewing a kinescope recording which they were told was a kinescope recording than they did from viewing a kinescope recording they were told was a film.

This effect of increased learning from kinescope introductions was attributed to: (1) a novelty effect of kinescope recordings which are associated with television which may motivate learning, (2) an impression of recency or immediacy which may be associated with television, or (3) a cultural bias for technological sanctions which may motivate learning.

[This study was replicated in 1955. See Hurst, P. M., Jr. Relative effectiveness of verbal introductions to kinescope recordings and training films, Instructional Television Research Report SDC 20-TV-2, Port Washington, New York: U. S. Naval Special Devices Center, 1955.]

Jacobs, James N. and Joan K. Bollenbacher. An experimental study of the effectiveness of television versus classroom instruction in sixth grade science in the Cincinnati Public Schools, 1956-57. Journal of Educational Research, 52 (1959), 184-189.

Problem: comparative effectiveness of TV and face-to-face instruction.

Sample: 315 sixth-grade students.

Subject taught: grade 6 science.

Key variables: learning, TV teaching, face-to-face teaching.

Twelve classes of grade 6 science located in 12 schools were taught by TV and face-to-face methods of instruction. Six classes were taught by TV and six classes taught by face-to-face methods. One teacher taught the TV sections and six regular classroom instructors taught the face-to-face sections. All classes used the same outline of material to be taught and met three times a week.

Students in both groups were chosen from IQ-ranked schools so that for each instructional method there would be two classes each of high, middle, and low ability. Classes within and between methods on instruction were also matched on location, size of school, and past achievement records. Two tests of achievement were used: (1) the Elementary Science Test of the California Test in social and related sciences, and (2) a locally constructed test of general science information. The first test was a pretest and used as an adjusting variable. The second test was used as a posttest to measure learning from the instruction methods. There was no significant difference between methods of instruction groups for the pretest, but within the groups the TV high-ability and middle-ability and the face-to-face low-ability groups scored significantly higher than their counterparts in the other group.

2--Jacobs, James N. and Joan K. Bollenbacher

Results. Using analysis of covariance technique for evaluating the data the following comparisons were made:

	Adjusted Means			
ABILITY LEVEL	TV Taught	Face-to-face Taught	t	P
High	45.63	40.51	5.06	beyond .01
Middle	32.77	33.15	0.29	nsd
Low	32.19	38.24	5.40	beyond .01

Conclusions. (1) There were significant gains in learning for all groups and methods of instruction. (2) TV instruction was significantly better for high-ability students than face-to-face instruction. (3) face-to-face instruction was significantly better for low-ability students than TV instruction. (4) There was no significant difference between methods of instruction for middle-ability students. (5) Further research is needed, says the author, to determine the cause for differential learning gains for methods of instruction.

Jacobs, James N. and Joan K. Bollenbacher. Teaching ninth grade biology by television. Audio-Visual Communication Review, 8 (1960), 176-191.

Problem: determine the relative effectiveness of pupil achievement in televised and face-to-face biology classes, the relative effectiveness by ability level, of instructional methods, and determine pupils' attitudes toward television.

Sample: about 400 ninth-grade Cincinnati pupils.

Subject taught: biology.

Key variables: ITV and face-to-face presentation, learning, ability level, and pupils' attitudes.

Pupils were assigned to ITV or non-ITV groups. ITV pupils watched 30-minute television lessons and had 20 minutes of follow-up. All pupils took alternate forms of the Cooperative Biology test as pre- and posttests, a facts-about-science instrument, an instrument used to assess attitude toward television, and a questionnaire.

An analysis of covariance controlling on initial Cooperative Biology test scores indicated that ITV pupils' scores on the Cooperative Biology posttest were significantly higher (.05 level) than face-to-face pupils. There was not a significant interaction between method of instruction and ability level.

An analysis of variance run of the facts about science test controlling on pretest scores indicated no significant differences between the scores of ITV and face-to-face pupils and no significant interaction between method of presentation and ability level. Pupils were neutral or favorable toward ITV.

Jacobs, James N., Joan Bollenbacher, and Mildred Keiffer. Teaching seventh-grade mathematics by television to homogeneously grouped below-average students. The Mathematics Teacher, Vol. 54, No. 7 (1961), 551-555.

Problem: determine intrinsic effectiveness of TV as means of instruction.

Sample: 258 students, 1 1/2 to 2 1/2 years retarded in arithmetic achievement.

Subject taught: mathematics.

Key variables: learning, TV teaching, face-to-face teaching, arithmetic achievement.

During Spring 1959, pupils with arithmetic grade equivalents between 4.5 and 5.5 were identified by scores on Stanford Intermediate Arithmetic Achievement Test. Schools were selected to participate in the experiment. Selected students in three junior high schools were formed into 12 classes. Six classes (two in each school) were taught mathematics by TV and six other classes (two in each school) were taught mathematics by face-to-face instruction. Instruction began in September. In March the Metropolitan Intermediate Arithmetic Achievement Test, Form Bm, was administered to all groups.

Results. (1) There was no significant difference between TV and face-to-face taught students on the computation section of the criterion test (MIAAT). (2) Four of the five comparisons on the problem-solving and concepts subtest of the criterion test (MIAAT) favored the TV-taught classes but only two differences were significant at the .05 level of confidence.

Conclusions. Television instruction is equally effective to face-to-face teaching instruction in teaching computation skills to the below-average students. Television instruction tends to be superior to face-to-face instruction for teaching problem solving and concepts to same group. Television instruction appears to be more effective with homogeneously grouped students than heterogeneously grouped students based on comparison of this experiment with other experiments conducted in the school system.

Janes, Robert W. An educational experiment with on-campus open-circuit television. Journal of Educational Sociology, 34 (1961), 300-308. Also in NAEB Research Fact Sheet, Series I, 98. NAEB Journal, 20 (1961), 1-2. (Abstract)

Problem: comparative effectiveness of TV and face-to-face instruction.

Sample: 375 college students.

Subject taught: social science.

Key variables: TV teaching, face-to-face teaching, viewing location, class attendance, attitude, interest in subject matter.

A social science course was presented over open-circuit television to students regularly enrolled in college. TV students could choose location for viewing instruction (residence halls, TV-equipped classrooms, etc.). Control section taught face-to-face met in large lecture hall on campus with the same instructor as TV-taught sections. Students could choose which method of instruction they preferred and could change method any time during the semester. Questionnaires were administered in the fourth and fourteenth weeks of the semester to measure student attitude, interviews were conducted with students during the semester, observations of student behavior were made, and reports from student discussion leaders were collected.

Results. At the beginning of the semester, 47 per cent of the students were in the TV section and 53 per cent in the face-to-face section. By the fourteenth week, 11 per cent of the face-to-face students transferred to the TV section, and 2 per cent of the TV students transferred to the face-to-face section. Eighty-six per cent of the TV students saw the lectures in one place and 14 per cent used a variety of viewing places. Students tended to view lectures in their place of residence. Students viewing lectures in residences tended to be positive in their evaluation of the method of instruction, but students viewing lectures in TV-equipped classrooms tended to be negative toward the instructional method.

Academic performance, measured by student grades and attendance, for the TV-taught group averaged a middle C and for the face-to-face taught group averaged a high C. Students with the lowest scores and the lowest rankings in high school classes were found in the 14 per cent of students in the course who did not regularly attend lectures. In the TV section, the poorer students had irregular and unorganized patterns of viewing while the better students attended regularly and viewed lessons in an organized manner.

Conclusions. (1) The TV presentations had more appeal than the classroom lectures taught face-to-face. (2) Students tended to view televised instruction in the residences. (3) The face-to-face students made slightly higher grades. (4) There was no significant difference in attitudes toward sociology for either method of instruction. (5) Certain unique gains relative to student motivation and increasing amount of space available for instruction may be possible through utilization of televised instruction with in-residence viewing.

Jantzen, Victor Warren, The effectiveness of television teaching of American Government compared with regular classes in Wichita High School South. Unpublished Doctor's dissertation, University of Oklahoma, Norman, 1963.

Problem: determine the relative effectiveness of televised and face-to-face presentation of American Government.

Sample: 165 high school seniors.

Subject taught: American Government.

Key variables: television and face-to-face presentation; learning.

Students were randomly assigned to control and experimental groups. Initially, all students took the SCAT, the High School Civics Test of the USAFI, and the Social Studies section of the STEP. Chi square technique did not reject the thesis that the two groups were random samplings from the same population.

F-tests and t-tests showed no significant differences among scores between the two groups, except that scores on individual unit tests for the National Government and Local Government units were higher in the face-to-face group than for the ITV group.

Johnson, F. Craig. A study of feedback in instructional television. Unpublished Doctor's dissertation, University of Wisconsin, Madison, 1958.

Problem: determine whether students in the studio enable the speaker to communicate more content.

Sample: 160 students viewing plus 80 instudio students.

Subject taught: listening.

Key variables: students in the studio, sex, speaker, learning.

Eight speakers delivered a message on listening over ITV which was received by eight groups of ten male and ten female students. All 160 students took a content test after the speech. Four of the speakers had an instudio group of twenty students to provide feedback; four speakers had none.

Analysis of variance technique applied to the instrument scores revealed no significant differences except between speakers. The hypothesis that having students in the studio does not change information received by the audience was not rejected.

Johnson, F. Craig. Feedback in Instructional Television. Journal of Communication, 10 (1960), 140-146. Also unpublished Doctor's dissertation, University of Wisconsin, 1958.

Problem: effectiveness of students in TV studio to provide feedback to instructor.

Sample: 160 students viewing, 80 students in studio.

Subject taught: listening skills.

Key variables: feedback from students in studio, sex, learning, speakers.

Eight speakers, faculty members chosen at random, presented information on listening skills to students in viewing rooms by closed-circuit television. Four of the speakers had 20 male students with them in the srudio to provide feedback during instruction. The other four were alone in the studio with the exception of the television crew. None of the speakers had prior TV speaking experience. Each speaker was given a copy of the material to be presented in an outline form and told to develop his presentation in any manner he thought acceptable to the audience and the occasion.

Eight groups of students from Speech I, Fundamentals of speaking, were chosen to receive instruction. There were 10 male and 10 female students in each group. Each group went to a viewing room and heard one of the speakers present the information. The initial ability of students to comprehend what they heard was measured on the Brown-Carlson Test of Listening Comprehension. Student learning was measured on a four-part test of content of the lectures. Each part of the test was a different form of question, i.e., multiple choice, true-false, completion, and matching.

Results. (1) The initial ability of the students to comprehend what they heard had no significant effect on the amount of information learned as measured by the content test. (2) There was no significant difference in learning between the groups taught by an instructor with feedback and those taught by an instructor without feedback.

Conclusions. Feedback, as provided in this study, does not appear to have a significant effect on communication. The differences in achievement that were found in the experiment came more from the differences in the instructors than the variability of feedback.

Johnson, F. Craig et al. An investigation of motion picture film and the program analyzer feedback to improve television teacher training. USOE Project Number 334. Athens, Ohio: Ohio University, April, 1960. (Mimeographed)

Problem:	evaluate the progran analyzer, sound film, and audiotape as television teacher-training aids.
Sample:	40 teachers and 1250 Ohio University freshmen.
Key variables:	audiotape, audiotape and program analyzer, sound film, sound film and program analyzer, and self-evaluation only; peer and students' ratings of teachers.

Forty teachers made three ITV presentations of one lesson and one ITV presentation of another lesson. Freshman students were randomly assigned in groups of seven or eight to view one of the 160 kinescopes. Lesson presentations were also evaluated by a peer teacher group, who rated teachers' effectiveness on a five-point scale. The program analyzer was used to sum all ratings. Intercorrelations of content, delivery, interest, and teaching effectiveness made by the peer teacher group correlated well with the program analyzer ratings, so that just the program analyzer ratings were used by the students.

Analysis of variance and covariance technique indicated no significant differences between the ratings given teachers who reviewed their presentations using sound film and those only using an audiotape. Also there were no significant differences between the audiotape group and those teachers who had no review of their presentations. Mean student ratings of teachers' effectiveness were significantly lower than mean ratings by peer teachers.

Johnson, Grace Nichols and Frances Harty. The Norfolk City Experiment in Instructional Television: The Big Picture, September 1957-June 1960. Norfolk, Virginia: Norfolk City Public Schools, Educational Television Project [1960]. [Report of Second Year abstracted in NAEB Journal (Research Fact Sheet, Series I, 80), 18 (December 1959), 1-4]

Problem: comparative effectiveness of TV and face-to-face teaching.

Sample: 10,266 students.

Subjects taught: Science, Spanish, The Arts, American History, and Geometry.

Key variables: IQ, previous achievement scores, socio-economic level, subject-matter pretests and posttests.

Students in four elementary, two junior high, and three senior high schools received instruction in five subjects for three years of experimentation. Matched groups of students in the same schools were taught the same subjects by face-to-face methods of instruction. The numbers of students and the grade levels for the courses were: Grade 5 Science, 1,413; Grade 6 Science, 1,488; Grade 5 Spanish, 973; Grade 6 Spanish, 1,047; Grade 5 The Arts, 973; Grade 6 The Arts, 1,047; Grade 8 American History, 1,539; Grade 9, General Science, 956; and Grade 10 Geometry, 830.

Using standardized tests the following comparisons between pretests and posttests were made:

COURSE	COMPARISON
Geometry	Significant difference favoring face-to-face instruction.
American History	Significant difference favoring TV instruction for white students. Non-significant difference favoring face-to-face instruction for Negro students.
Elementary Science	Significant difference in gain for Grade 5 and Grade 6 students in white schools taught by TV. Non-significant gains favoring TV instruction for Negro schools.

2--Johnson, Grace Nichols and Frances Harty

Conclusions. Children in larger than normal size classes learned as much from televised instruction as those in conventional sized classrooms. Based on the number of comparisons made the authors conclude that students tended to learn as much from television teaching as from face-to-face teaching.

This study also includes a survey of the uses of instructional television in the Norfolk schools, a description of the administration of the project, the training of the television teachers, and a summary of subjective reactions to the project by students, teachers, and parents.

Johnson, Hildegard Binder. A Comparative Study of an Introductory Geography Course on ETV and in the Classroom. Saint Paul, Minnesota: Macalester College, 1960.

Problem: comparative teaching effectiveness and learning retention of television and face-to-face teaching of college course.

Sample: TV-taught group N = 66. Face-to-face N not specified.

Subject taught: Introductory Geography.

Key variables: TV, face-to-face instruction. Learning gains measured by multiple-choice test given as pretest, posttest, and delayed retest.

Sixty-six students enrolled in geography course offered over open-circuit ETV Station KTCA. Forty-four students viewed the course on campus and 22 enrolled from off campus. This group was called the experimental group. The control group was two sections of the geography course taught face-to-face on the campus by the same instructor who taught the TV course. Students were given a 50-item multiple-choice test as a pretest. The same test was given as posttest for final examination in the course. The same test was again given as a delayed posttest to measure retention three months after the conclusion. All of the students who enrolled in the course did not take the delayed posttest, but all of the TV group did and most of one of the face-to-face sections.

Reliability of test was .75 measured by split half method using maximum likelihood estimates of the correlation coefficients and adjusting for number of items. Students in TV class scored significantly higher on posttest as final examination than on pretest (t-value was 9.3 which is significant at the .001 level). Therefore, author concludes TV is effective means of instruction. Variability from pretest to posttest was significant at only the .20 level and author concludes this was due to chance. Both face-to-face taught sections also increased learning significantly with a non-significant increase in variability.

Permanence of learning was tested by administering the same posttest as a delayed posttest three months later. TV-taught students retained 96 per cent of the material contained on the test with non-significant changes in scores and variability. Only one of the two face-to-face sections could be examined for retention. They retained 95 per cent of the material on the final test with non-significant changes in scores and variability.

Comparisons between the TV-taught and the face-to-face taught groups were obtained by analysis of variance and analysis of covariance with adjustment for high school rank and MSAT scores. Significantly higher achievement was noted for the two face-to-face sections. There was a non-significant difference in the interactions of ability levels and methods of instruction.

The author concludes (1) students learned significantly from both face-to-face and TV instruction, (2) students retained a high percentage of material learned after three months, (3) students of high ability learn more than students of low ability regardless of method of instruction, and (4) students taught face-to-face achieved a higher mean score than did students taught by TV.

Kale, Shrikrishna Vasudeo. Learning and retention of English-Russian vocabulary under different conditions of motion picture presentation. State College: The Pennsylvania State College, 1953. (Multilith)

Problem: determine the relative effectiveness in retention of English-Russian noun and verb pairs with different presentations.

Sample: 409 college students.

Subject taught: Russian-English nouns and verbs.

Key variables: words alone, words with still pictures, with silent motion pictures, with sound motion pictures and sound motion pictures with learner participation.

Still pictures were more effective than words alone and sound pictures were more effective than still pictures. However, there were no differences between sound pictures, and sound pictures and learner participation.

All differences disappeared on retention tests after one week.

[See:

Grosslight, J. H. and Charles McIntyre. Exploratory Studies in the Use of Pictures and Sound for Teaching Foreign Language Vocabulary. SDC-269-7-53. Instructional Film Research Reports. Port Washington, N. Y.: U. S. Naval Special Devices Center. 1955.

This report contains Kale's original study plus an additional study with some modifications and refinements.]

Kanner, Joseph H., Sanford Katz and Peter B. Goldsmith. Evaluation of "intensive" television for teaching basic electricity. Long Island: Army Pictorial Center, January, 1958. Audio-Visual Communication Review, 7 (1959), 307-308. (Abstract)

Problem: determine the relative effectiveness of 38 hours of continuous learning by ITV and face-to-face presentation.

Sample: 124 trainees.

Subject taught: basic electricity.

Key variables: learning, retention, and aptitude level; ITV and face-to-face presentation.

Trainees were divided into experimental and control groups; the same instructors and materials were used for both groups. The experimental group had 38 hours of ITV over a five-day period, and the control group had 38 hours of face-to-face instruction over the same period. Ss in both groups took a retention test one month later.

There were no consistent differences between experimental and control groups' scores. Aptitude level was more important than the instructional medium in determining test performance.

Kanner, Joseph H. and Wesley P. Marshall. Television in basic training: The improvement of training by television. Audio-Visual Communication Review, 11 (1963), 191-199.

Problem: determine learning from ITV.

Sample: 312 trainees at Ft. Dix.

Subject taught: basic training.

Key variables: television and face-to-face presentation; learning; aptitude.

Two companies were matched by AFQT scores. One company received face-to-face basic training; the other company had 58 hours of ITV and 30 hours of preview-review ITV given in their barracks after hours.

All trainees were tested immediately after each lesson presentation. In addition to these 25 tests, all trainees also took a 240-item multiple-choice and a 50-item pictorial-identification test.

For the 25 tests, the ITV company achieved significantly higher scores (.05 level) 11 times, the face-to-face company six times, and the other 8 tests showed no significant differences. Dividing each company into four groups by AFQT scores indicated that both superior and lower ability trainees in the TV company achieved higher scores than face-to-face trainees of comparable ability. Scores of ITV trainees on the 240-item test and on the 50-item pictorial test were significantly higher (.05 level) than scores of face-to-face trainees.

Kanner, Joseph H. and Alvin J. Rosenstein. Television in army training: color vs. black and white. Audio-Visual Communication Review, 8 (1960), 243-252.

Problem: determine the relative effectiveness in learning from black and white and color television.

Sample: 368 trainees at Ft. Monmouth.

Subject taught: electronics and photographic lessons.

Key variables: color and black and white television presentation; learning.

Matched pairs were assigned to color or black and white viewing conditions. Trainees were tested over each of the eleven lessons. Some of the test questions were designed particularly to assess the influence of color on learning, as color coding on resistors. Of the eleven comparisons between color and black and white groups, there was a significant difference for only one lesson (.05 level, favoring the color groups). When trainee scores were analyzed by high- and low-ability groups, it was found that low-ability groups tended to learn more from color than from black and white, and high-ability groups more from black and white. However, for practical purposes, the differences were not great enough to justify the use of color television. There were no significant differences between groups in the number of color or non-color test items answered correctly.

Kanner, J. H., R. P. Runyon and O. Desiderato. Television in Army training: evaluation of television in Army basic training. George Washington University Technical Report 14. Washington, D. C.: Human Resources Research Office, 1954. [Original unavailable to authors, prepared from Kumata, Hideya. Inventory of Instructional Television Research. Ann Arbor: Educational Television and Radio Center, 1956. pp. 70-73.]

Problem: comparative effectiveness of TV, TV recording, and face-to-face instruction.

Sample: about 400 Army trainees.

Subject taught: basic military skills (see below).

Key variables: TV teaching, recorded (kinescope) TV teaching, face-to-face teaching, Army General Classification Test, immediate achievement, long-term retention, student reaction.

Research using Army basic trainees at Camp Gordon, Ga. was carried out to answer the following questions: (1) Differences between TV and regular instruction for basic training courses, (2) Differences between kinescope recordings and regular instruction, (3) Differences in retention between TV and regular instruction, (4) Differences between high- and low-aptitude basic trainees on learning and retention through TV and regular instruction, (5) The effects of a kinescope review on retention compared with effects of no further training on retention for high- and low-aptitude trainees.

In addition, trainee reactions to TV were obtained.

Fourteen hours selected from the first eight weeks of basic training were used. Subjects selected were: Functioning of the Ml rifle; Signal Communications; Military Justice; Mines and Booby Traps; Map Reading (7 hours); Squad Tactics; Defense against Air and Armor; and Disassembly of the Light Machine Gun.

Two experienced instructors, rated superior by the camp instructional committee, were chosen for each of the 14 hours. Each instructor taught both TV and face-to-face instruction hours. For 11 of the 14 hours, one instructor taught face-to-face while the other taught the TV class. The instructors reversed their roles when the same subject was taught to another group. For the remaining three hours, the same instructor taught both the face-to-face and the TV classes simultaneously.

Two basic training companies of 200 trainees were used for comparisons. Each of the companies was split into two groups matched for Area I scores on the Army Classification Test. Several other basic training companies, similarly split into two matched groups, were used for the kinescope vs. face-to-face instruction experiments.

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Seventeen tests were constructed for the 14 hours, including written tests consisting of multiple-choice, fill-in, and picture identification items and performance tests. A posttest-only design was used for all of the comparisons. To obtain a baseline performance, all of the tests except the performance test for Light Machine Gun disassembly were given to another basic training company which resembled the test companies. This company had not received any of the 14 hours of instruction when tested.

Findings. For immediate posttest, comparisons between face-to-face instruction and TV instruction showed: (1) There were no significant differences between the mean scores of both groups on 12 of the 17 tests. (2) In five of the 17 tests, there was a significant difference in mean scores of the two groups. In each case, TV scores were superior. (3) Splitting both groups into high- and low-aptitude sub-groups, comparisons within sub-groups showed:

a. No differences could be found between TV and face-to-face instruction on high-aptitude groups. A possible explanation by the authors is that since high-aptitude people scored near the ceiling of the tests, there was little room for differences.

b. Among low-aptitude groups, seven of the 17 tests showed no significant differences in comparison of mean scores. For 10 of the 17 tests, significant differences appeared. In each instance, TV was superior to face-to-face instruction.

For retention testing, administered about a month after the instruction, results were: (1) There was decrement in amount retained for both the TV and the face-to-face instruction groups except for two tests -- M1 functioning and military justice -- where both groups scored higher than their immediate posttest scores. Authors explain this by saying that the M1 rifle is a constant companion of the basic trainee and thus learning goes on after the end of formal instruction. Similarly, the mere presence in a military environment is enough to account for learning in a subject such as military justice. (2) in 10 of the 14 retention tests, there were no significant differences between mean scores of the TV and face-to-face instruction groups. Tests on the light machine gun and one hour of the map reading series were not given. (3) In four of the 14 tests, there were significant differences in comparisons of mean scores. In each case, TV was superior. (4) Splitting both groups into high- and low-aptitude groups, it was found that:

a. In 10 of 14 tests, there were no significant differences between mean scores of low-aptitude men.

b. In four of the 14 tests, there were significant differences among low-aptitude men. In each case, TV was superior.

c. No tests were run on the scores of high-aptitude men.

In comparisons between kinescope recording and face-to-face instruction, it was found that (kinescopes were used for only seven of the 14 hours); (1) There were no significant differences between face-to-face instruction and kinescope groups for six of the seven tests. (2) There was a significant difference between the two groups on one of the seven tests. The kinescope group was superior in this comparison.

In five of the tests, part of the trainees who had received face-to-face instruction, TV instruction or kinescope instruction were given a kinescope refresher before taking retention tests. Results showed that: (1) Performances in all five tests were significantly higher than scores made on immediate posttests. (2) Those who did not take a kinescope refresher showed a decrement in amount learned, except for the military justice test (discussed above). (3) Low-aptitude men showed significantly higher scores over their immediate posttests after kinescope refresher training. (4) Gains after refresher training were such that low-aptitude men scored almost as high as high-aptitude men scored on their immediate posttests.

With respect to the novelty of motivation effects of TV training, authors state that the evidence points against a novelty effect operating. Efforts were made to reduce additional motivation to TV students by telling all trainees that they were engaged in an important study. The experimenters went so far as to give distinctive insignia to all involved. Although novelty effects were not tested, a look at test scores after TV instruction revealed that the largest differences favoring TV were for three instructional hours which came after five, eight, and 13 exposures to TV instruction. Authors state that perhaps TV effectiveness is related to subject-matter content.

Items in the tests were categorized by the type of information being measured and the presentation methods employed to impart the information. The six categories which they devised were: (a) imparting simple items of information, (b) teaching nomenclature of pieces of equipment, (c) teaching interrelationships among parts of equipment, (d) teaching paired-associate learning, (e) giving recognition training, and (f) teaching manipulation of small pieces of equipment. By tabulating the number of items showing significant superiority for either regular or TV instruction within each of the six categories, the authors found that for the last four categories, there was a significant difference in the number of items favoring television.

Kanner, Joseph H. et al. Television in army training. Audio-Visual Communication Review, 6 (1958), 255-291.

Study I

Problem: determine the effectiveness of 38 hours of televised instruction in five days, compared with five days of face-to-face instruction.

Sample: 281 enlisted men.

Subject taught: power maintenance.

Key variables: television and face-to-face presentation, learning, retention.

Trainees were divided into TV and face-to-face groups. Tests were given after morning and afternoon sessions, or ten tests altogether for the week. A retention test was given one month after the first week.

Scores of face-to-face trainees on the ten tests were slightly higher than scores of trainees in the TV groups. The authors indicate this might be due to the lecture having almost no visualization and therefore little interest. The high-level aptitude group was consistently higher than the low-aptitude group regardless of presentation method. Scores of the face-to-face trainees on the delayed (one-month) posttest were about the same as scores of TV trainees. No indication was found that intensive television sessions are more detrimental to classroom learning than face-to-face instruction.

Study II

Problem: determine the effectiveness of using television and decreased training time, and to evaluate rapid training of TV teachers.

Sample: Ft. Gordon trainees.

Subject taught: power maintenance.

Key variables: training time, teacher experience and kinescope presentation, learning.

(continued)

The ten tests described above were shortened by dropping non-discriminating, too hard, or too easy items, and modified into six tests. These were given after morning and afternoon sessions for each of the three days of the instruction. The former 50-minute periods were condensed to half-hour kinescopes. The same delayed posttest used in study I was used in this study.

Analysis of variance and *t*-tests indicated that scores of the trainees receiving 38 hours of instruction were significantly higher on both immediate and delayed posttests than were scores of the trainees receiving 16 hours of instruction. There were no differences in immediate or delayed posttest scores among trainees in the kinescope, live experienced instructor, or live inexperienced instructor groups.

It may be that part of the learning differences between the 38-hour group and the 16-hour group were due to (1) less time to take the achievement test in the 16-hour session and (2) less comfortable viewing conditions in the 16-hour sessions.